TOSHIBA

FILE NO. 053-200110

SERVICE MANUAL

COLOR TELEVISION

42HM66

PARTS AND DIAGRAMS

DOCUMENT CREATED IN JAPAN, Nov., 2006

TABLE OF CONTENT

1. Precautions and Safety Notices

Prior to using this manual, please ensure that you have carefully followed all the procedures outlined in the user manual for this product.

- Read all of these instructions.
- Save these instructions for later use.
- Follow all warnings and instructions marked on the product.
- Do not use this product near water.
- This display should be installed on a solid horizontal base.
- When cleaning, use only a neutral detergent cleaner with a soft damp cloth. Do not spray with liquid or aerosol cleaners.
- Do not expose this display to direct sunlight or heat. Hot air may cause damage to the cabinet and other parts.
- Adequate ventilation must be maintained to ensure reliable and continued operation and to protect the display from overheating. Do not block ventilation slots and openings with objects or install the display in a place where ventilation may be hindered.
- Do not install this display near a motor or transformer where strong magnetism is generated. Images on the display will become distorted and the color irregular.
- Do not allow metal pieces or objects of any kind fall into the display from ventilation holes.

Slots and openings in the cabinet and the back or bottom are provided for ventilation, to ensure reliable operation of the product and to protect it from overheating, those openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.

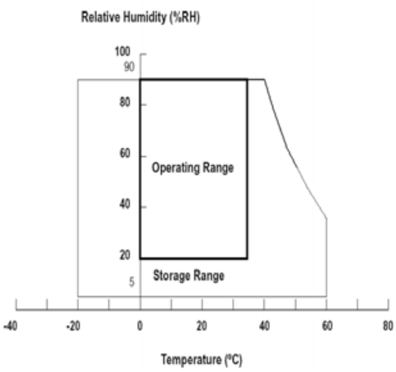
2. Specification

2.1. General

2.1.1 General Description (Quick Reference)

42 inch Real-Projection TV Specification

Model Name		DVR-4240 TA CA
Panel	Type Color	42" (42" viewable diagonal area), Rear projection, 1280 x 720 (By SmoothPicture™ Technology)
Input Signal	Video/Audio	HDMI * 1 (HDCP support) / RCA (L/R) * 1 TV system antenna *1 / NTSC /ATSC / CLEAR QAM Component Video * 2 / RCA (L/R) Stereo * 2 Composite * 1 / S–Video * 1 / RCA (L/R) stereo * 1 Composite * 1 / RCA (L/R) Stereo * 1
Output Signal		Output1: 1 R/L audio output Output2: SPDIF Coaxial
HDTV Compatibility		480i, 480P, 720P, 1080i
Speaker Output		10w (x2 Channels)
Power	Voltage	100~132VAC (USA)
Temperature (Note A)	Operating	+10 to + 40° C (Hum.<90%)
	Storage	-20 to +60 °C (Hum.< 35 %)
Humidity (Relative). (Note A)	Operating	20 to 90% non-condensing.(Ta< 35%)
	Storage	10 to 90% non-condensing. (Note A)
	Wet-bulb temperature should be 39 °C Max. (Ta> 40°C)	
	Note A: The temperature and relative humidity range is shown in right side	
Altitude	Operating	0 to 3,000 m
	Storage	0 to 12,000m
Dimensions	Physical	996mm (W) x 721.5mm (H) x 319.5mm (D)
Weight	Net / Gross	25.5kg / 31.5kg
Regulations		UL, CUL, FCC
Power saving Modes	Active Off	Power off < 1 W at 110VAC



Preset Timing Mode (Pre-adjusted to reduce blanking: 1280 x 720 at 60Hz)

Warning: Do not set the graphics card in your computer to exceed these refresh rates; doing so may result in permanent damage to the RPTV.

Note: Product Specifications are subject to change without notice.

2.2 Instrument Test

2.2.1. Luminance test.

Select HDMI 1280x720 @ 60Hz input: (Contrast, Brightness =default)

2.2.1.1 White balance.

a. WARM:

$x = 0.313 \pm 0.01$. $y = 0.329 \pm 0.01$.

b. MEDIUM:

$x = 0.289 \pm 0.01$. $y = 0.289 \pm 0.01$.

c. COOL:

$x = 0.270 \pm 0.01$. $y = 0.270 \pm 0.01$.

2.2.1.2 Adjust contrast & brightness to 100%, the Y > $400cd/m^2$.

2.2.1.3 In HDMI mode with contrast and brightness =default) and the 32 grays scale have 2 bright scale saturation is acceptable.

When Contrast 100% and with 32grays need > 4 level saturation.

In video mode (Color Stream HD, Composite, S-Video, TV, DVI-HDTV mode):

When Contrast 100% and with 32grays need > 4 level saturation.

2.2.1.4 White uniformity: (9 point max.- 9 point min.) Meter normal to Screen.

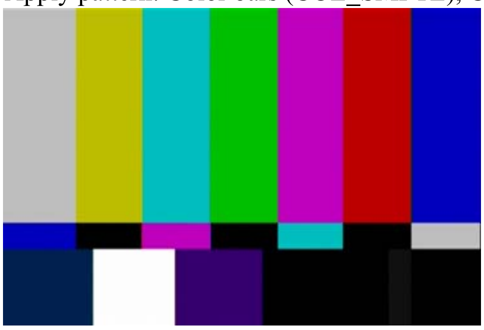
a. Specification: Δx and Δy should be less than ΔWx: 0.016, ΔWy:0.020

1	4	7
2	5	8
3	6	9

2.2.2. Picture performance test.

2.2.2.1 Video performance test:

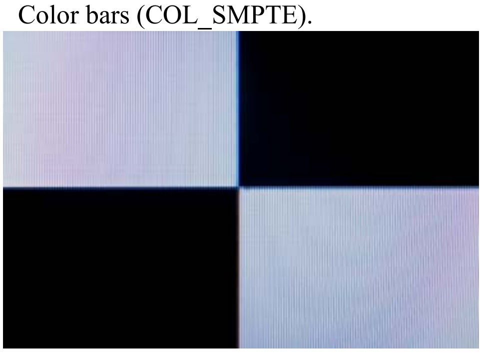
Apply pattern: Color bars (COL_SMPTE), Crosshatch, Multi burst, Black & White, Gray scale.



Color bars (COL_SMPTE).



Multi burst.



Black & White.

FIG.18

2.2.2.1.1 Connected video signal source to AV port:

2.2.2.1.1.1 In color bar (COL_SMPTE) pattern,

a. The color from left side to right side should be White, Yellow, Sky Blue, Green, Magenta, Red and Blue.
b. The low light 10.7 IRE in the right bottom side should be separate clear.
c. Used the Blue color filter to check the Hue and Saturation were in the optimize point.
(Saturation: The Blue and White color should be the same when see through by Blue color filter.)
(Hue: The Magenta and Sky Blue color should be the same when see through by Blue color filter.)

2.2.2.1.1.2 In Crosshatch pattern, it should be no visible noise.

2.2.2.1.1.3 In Multi burst pattern:

a. In low bandwidth pattern, there are no any dots on the edge transitions.
b. In high bandwidth pattern, can not loss any resolution and the scaling should be correct.
c. There is no visible noise in this pattern.

2.2.2.1.1.4 In Black & White, there is no any trouble at edge transition.

2.2.2.1.1.5 In Gray Scale pattern, the gray scale should not be saturation.

2.2.2.1.2. Connected video signal source to S-Video port:

2.2.2.1.2.1 In color bar (COL_SMPTE) pattern:

a. The color from left side to right side should be White, Yellow, Sky Blue, Green, Magenta, Red and Blue.
b. There were no any dot crawl between color bar, but still had light smearing.
c. The low light 10.7 IRE in the right bottom side should be separate clear.
d. Used the Blue color filter to check the Hue and Saturation were in the optimize point.
(Saturation: the Blue and White color should be the same when see through by Blue color filter.)
(Hue: the Magenta and Sky Blue color should be the same when see through by Blue color filter.)

2.2.2.1.2.2. In Crosshatch pattern, it should be no visible noise.

2.2.2.1.2.3 In Multi burst pattern:

a. In low bandwidth pattern, there are no any dots on the edge transitions.
b. In high bandwidth pattern, can not loss any resolution and the scaling should be correct.
c. There is no visible noise in this pattern.

2.2.2.1.2.4 In Black & White, there is no any trouble at edge transition.

2.2.2.1.2.5 In Gray Scale pattern, the gray scale should not be saturation.

2.2.2.1.3 Connected video signal source to Color Stream HD (YPbPr) port:

2.2.2.1.3.1 In color bar (COL_SMPTE) pattern:

a. The color from left side to right side should be White, Yellow, Sky Blue, Green, Magenta, Red and Blue.
b. There were no any dot crawl and smearing between color bar.
c. The low light in the right bottom side should be separate clear.

2.2.2.1.3.2. In Crosshatch pattern, it should be no visible noise.

2.2.2.1.3.3 In Multi burst pattern:

a. In low bandwidth pattern, there are no any dots on the edge transitions.
b. In high bandwidth pattern, can not loss any resolution and the scaling should be correct.
c. There is no visible noise in this pattern.

2.2.2.1.3.4 In Black & White, there is no any trouble at edge transition.

2.2.2.1.3.5 In Gray Scale pattern, the gray scale should not be saturation.

2.2.2.1.4 Connected video signal source to TV (Composite Video) port:

2.2.2.1.4.1 Test Channel:

a. Channel 1 ~ Channel 6 (55.25 MHz ~ 77.25 MHz), choice one channel to test.
b. Channel 95 ~ Channel 99 (91.25 MHz ~ 115.25 MHz), choice one channel to test.
c. Channel 14 ~ Channel 22 (121.25 MHz ~ 169.25 MHz), choice one channel to test.
d. Channel 7 ~ Channel 94 (175.25 MHz ~ 643.25 MHz), choice one channel to test.
e. Channel 100 ~ Channel 125 (649.25 MHz ~ 799.25 MHz), choice one channel to test.

2.2.2.1.4.2 In color bar (COL_SMPTE) pattern,

a. The color from left side to right side should be White, Yellow, Sky Blue, Green, Magenta, Red and Blue.
b. The low light 10.7 IRE in the right bottom side should be separate clear.
c. Used the Blue color filter to check the Hue and Saturation were in the optimize point.
(Saturation: the Blue and White color should be the same when see through by Blue color filter.)
(Hue: the Magenta and Sky Blue color should be the same when see through by Blue color filter.)

2.2.2.1.4.3 In Crosshatch pattern, it should be no visible noise.
2.2.2.1.4.4 In Multi burst pattern:

a. In low bandwidth pattern, there are have same dots on the edge transitions which are acceptable.
b. In high bandwidth pattern, there are cannot loss any resolution and the scaling should be correct.

2.2.2.1.4.5 In Black & White, there is no any trouble at edge transition.
2.2.2.1.4.6 In Gray Scale pattern, the gray scale should not be saturation.
2.2.2.1.4.7 Apply cable TV or RF pattern generator signal and the RF sensitivity set to 45 ~85dBμV, the image should be displayed.
If under 60dBμV, the image had snow noise was acceptable but can not loss any color.
2.2.2.1.4.8 TV Channel Auto Scan

a . The NTSC system TV channel and frequency table as 2.4 TV Channel Table

2.2.2.1.4.9 V-Chip & Close caption function test:

a. Close caption:
  a.1 Select the “Close Caption” (In main picture OSD) to CC1, CC2, CC3, CC4, TT1, TT2, TT3, TT4.
  a.2 Setting the FLUKE 54200 or VG848 / 858 function to CC number 1, CC number 2, CC number 3, CC number 4, CC number 5, CC number 6, CC number 7, CC number 8, the function should be normally. Or
  a.3 Used signal center channel with CC function. TV select to same CC number with signal center.
b. Parental Control
  b.1 Select the “Parental Control” in OSD and key in password “2097” enter to the TV rating and setting all the rating to “LOCKED”.
  b.2 Setting the FLUKE 54200 or VG848 / 858 or used signal center channel with CC Sequence, the image will be locked and show key in password and rating message. After key in password and the password is correct, the image will display again.

2.2.2.1.5 Distortion test:

a. Apply green cross hatch pattern.
b. Distortion spec:
  b-1. Tilt spec: (Parallelogarm)
    |A-K| <=5mm |E-G| <=5mm.
    |B-D| <=5mm |J-H| <=5mm.
    b-2. Keystone spec:
    |(A+E) - (K+G)| <= 6mm.
    |(B+J) - (D+H)| <= 7mm.
  b-3. Distortion spec: (Pincushion and Barrel)
    |(A-L) + (K-L)| /2 less than 5mm.
    |(E-F) + (G-F)| /2 less than 5mm.
    |(B-C) + (D-C) |/2 less than 4mm.
    |(J-I) + (H-I)| /2 less than 4mm.
  b-4. Position spec:
    H position: |C-I| <= 8mm.
    V position: |L-F| <= 10mm.

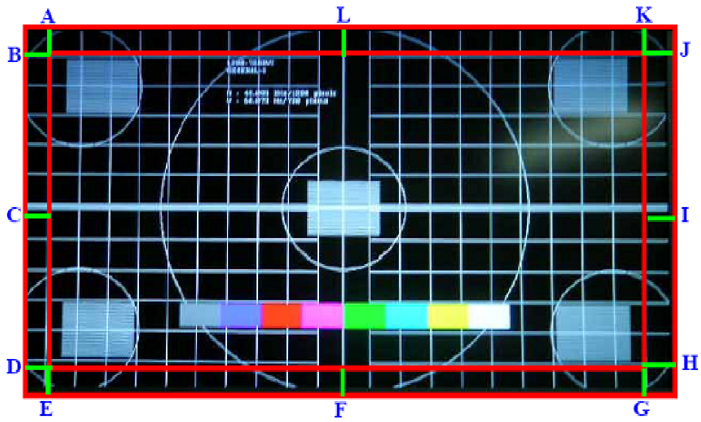


FIG.7

2.2.2.1.5 Focus:

Used TV tested pattern inspect Focus and Flare. In factory menu to enter SYSTEM then select to DLP TEST PATTERN press ENTER button by remote control. The Green Diagonal line will display on screen. The EXIT button can return to factory menu.

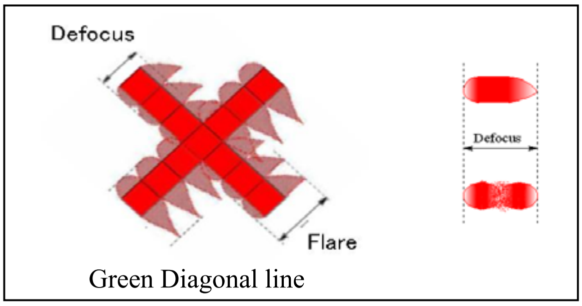


Fig26.

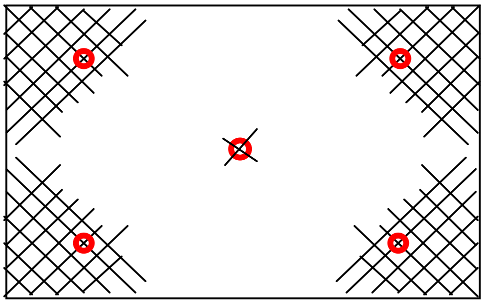


Fig27.

Optical engine:

Unit (pixel)	Center	Corner
Focus	1.7	2.1
Flare	2	2.5

Full set:

Unit (pixel)	Center	Corner
Focus	1.9	2.4
Flare	2.2	3.0

3. Power supply tests.

3.1 Power consumption test table:

TV status	LED color	Picture	Power consumption
Power on (Normal operation)	Green	Active	<280W
DC power off (stand by)	Orange	NA	<1W at $110V_{AC}$

3.2 Dielectric withstand voltage：

3.2.1 Primary to safety ground：$2500V_{DC}$ for 1.5 sec.

3.2.2 Leakage current ≦ 10mA

4. DDC test.

4.1 DDC / EDID specification compliance requirement.
The data that is communicated shall be stored in the monitor in non-volatile, which is a subset of the VESA EDID version 3.0 standard.

4.2 The EDID data see **DDC contents.**

5. Audio test:

5.1 Connected AV1 & AV2 (AV & S-Video) audio input source to AV L/R audio input, the speaker L and R should be output and the distortion (THD) ≦ 10% at 20Hz to 20KHz, and the audio function of Balance, Bass, Treble should be working normally.

5.2 Connected Color Stream HD 1 & 2 audio input source to Color Stream HD 1 & 2 L/R audio input, the speaker L and R should be output and the distortion (THD) ≦ 10% at 20Hz to 20KHz, and the audio function of Balance, Bass, Treble should be working normally.

5.3 Audio output test: When each audio had input, then audio output RCA jack (L/R), must output 0.5Vrms (1.414Vp-p).

6. HDCP test. (Only for HDCP model)

6.1 See the **HDCP test.**

2.3. TV Channel Table.

Channel Number	Picture Carrier Frequency (MHz)			
	AIR	CABLE		
		STD	HRC	IRC
1	---	---	72.00	73.25
2	55.25	55.25	54.00	55.25
3	61.25	61.25	60.00	61.25
4	67.25	67.25	66.00	67.25
5	77.25	77.25	78.00	79.25
6	83.25	83.25	84.00	85.25
7	175.25	175.25	174.00	175.25
8	181.25	181.25	180.00	181.25
9	187.25	187.25	186.00	187.25
10	193.25	193.25	192.00	193.25
11	199.25	199.25	198.00	199.25
12	205.25	205.25	204.00	205.25
13	211.25	211.25	210.00	211.25
14	471.25	121.25	120.00	121.25
15	477.25	127.25	126.00	127.25
16	483.25	133.25	132.00	133.25
17	489.25	139.25	138.00	139.25
18	495.25	145.25	144.00	145.25
19	501.25	151.25	150.00	151.25
20	507.25	157.25	156.00	157.25
21	513.25	163.25	162.00	163.25
22	519.25	169.25	168.00	169.25
23	525.25	217.25	216.00	217.25
24	531.25	223.25	222.00	223.25
25	537.25	229.25	228.00	229.25
26	543.25	235.25	234.00	235.25
27	549.25	241.25	240.00	241.25
28	555.25	247.25	246.00	247.25
29	561.25	253.25	252.00	253.25
30	567.25	259.25	258.00	259.25
31	573.25	265.25	264.00	265.25
32	579.25	271.25	270.00	271.25
33	585.25	277.25	276.00	277.25
34	591.25	283.25	282.00	283.25
35	597.25	289.25	288.00	289.25
36	603.25	295.25	294.00	295.25
37	609.25	301.25	300.00	301.25
38	615.25	307.25	306.00	307.25
39	621.25	313.25	312.00	313.25
40	627.25	319.25	318.00	319.25
41	633.25	325.25	324.00	325.25
42	639.25	331.25	330.00	331.25
43	645.25	337.25	336.00	337.25
44	651.25	343.25	342.00	343.25
45	657.25	349.25	348.00	349.25

Channel Number	Picture Carrier Frequency (MHz)			
	AIR	CABLE		
		STD	HRC	IRC
46	663.25	355.25	354.00	355.25
47	669.25	361.25	360.00	361.25
48	675.25	367.25	366.00	367.25
49	681.25	373.25	372.00	373.25
50	687.25	379.25	378.00	379.25
51	693.25	385.25	384.00	385.25
52	699.25	391.25	390.00	391.25
53	705.25	397.25	396.00	397.25
54	711.25	403.25	402.00	403.25
55	717.25	409.25	408.00	409.25
56	723.25	415.25	414.00	415.25
57	729.25	421.25	420.00	421.25
58	735.25	427.25	426.00	427.25
59	741.25	433.25	432.00	433.25
60	747.25	439.25	438.00	439.25
61	753.25	445.25	444.00	445.25
62	759.25	451.25	450.00	451.25
63	765.25	457.25	456.00	457.25
64	771.25	463.25	462.00	463.25
65	777.25	469.25	468.00	469.25
66	783.25	475.25	474.00	475.25
67	789.25	481.25	480.00	481.25
68	795.25	487.25	486.00	487.25
69	801.25	493.25	492.00	493.25
70		499.25	498.00	499.25
71		505.25	504.00	505.25
72		511.25	510.00	511.25
73		517.25	516.00	517.25
74		523.25	522.00	523.25
75		529.25	528.00	529.25
76		535.25	534.00	535.25
77		541.25	540.00	541.25
78		547.25	546.00	547.25
79		553.25	552.00	553.25
80		559.25	558.00	559.25
81		565.25	564.00	565.25
82		571.25	570.00	571.25
83		577.25	576.00	577.25
84		583.25	582.00	583.25
85		589.25	588.00	589.25
86		595.25	594.00	595.25
87		601.25	600.00	601.25
88		607.25	606.00	607.25
89		613.25	612.00	613.25

Channel Number	Picture Carrier Frequency (MHz)			
	AIR	CABLE		
		STD	HRC	IRC
90		619.25	618.00	619.25
91		625.25	624.00	625.25
92		631.25	630.00	631.25
93		637.25	636.00	637.25
94		643.25	642.00	643.25
95		91.25	90.00	91.25
96		97.25	96.00	97.25
97		103.25	102.00	103.25
98		109.25	108.00	109.25
99		115.25	114.00	115.25
100		649.25	648.00	649.25
101		655.25	654.00	655.25
102		661.25	660.00	661.25
103		667.25	666.00	667.25
104		673.25	672.00	673.25
105		679.25	678.00	679.25
106		685.25	684.00	685.25
107		691.25	690.00	691.25
108		697.25	696.00	697.25
109		703.25	702.00	703.25
110		709.25	708.00	709.25
111		715.25	714.00	715.25
112		721.25	720.00	721.25
113		727.25	726.00	727.25
114		733.25	732.00	733.25
115		739.25	738.00	739.25
116		745.25	744.00	745.25
117		751.25	750.00	751.25
118		757.25	756.00	757.25
119		763.25	762.00	763.25
120		769.25	768.00	769.25
121		775.25	774.00	775.25
122		781.25	780.00	781.25
123		787.25	786.00	787.25
124		793.25	792.00	793.25
125		799.25	798.00	799.25

2.4. Preset Timing Chart & Reference Timing Table

RF Video Input

Analog Video Input			Demodulated Video		
Signal Formal	Freq.	Channels	Signal Formate	Horizontal Freq. (KHz)	Vertical Freq. (Hz)
RF Modulate System M	55.25~801.25	2~69 (Antenna) 1~125 (Cable)	4:3 & 16:9 Composite NTSC	15.734	59.940

Base band Video Input

Analog Video Input			Decoded Digital Video		
Signal Formal	Horizontal Freq. (KHz)	Vertical Freq. (Hz)	Active Resolution	Total	Pixel clock (MHz)
4:3 & 16:9 Composite YC/YcbCr NTSC	15.734	59.940	720*240 / 59.94 I	858*525	13.500

Color Stream HD Video Input

	Format	V scan line	H pixel	Aspect ratio	Scan format	Frame (fps)
HDTV	1080i	1080	1920	16:9	Interlaced scan	30
	720p	720	1280	16:9	Progressive scan	60
EDTV	480p	480	704	16:9	Progressive scan	60
	480p	480	704	4:3	Progressive scan	60
	480p	480	640	4:3	Progressive scan	60
SDTV	480i	480	704	16:9	Interlaced scan	30
	480i	480	704	4:3	Interlaced scan	30
	480i	480	640	4:3	Interlaced scan	30

HDMI timing:

Mode No.	1	2	3	4	5	6	7	8	9	10
Mode Name	VESA 640 x 480	MAC 640 x 480	VESA 640 x 480	VESA 640 x 480	TEXT 720 x 400	VESA 800 x 600	VESA 800 x 600	VESA 800 x 600	VESA 800 x 600	MAC 832 x 624
Horizontal Freq. (KHz)	31.469	35.000	37.861	37.500	31.469	35.156	37.879	48.077	46.875	49.727
Video clock Freq. (MHz)	25.175	30.240	31.500	31.500	28.322	36.000	40.000	50.000	49.500	57.285
Sync. Polarity	−	−	−	−	−	+	+	+	+	−
H. total (Dots)	800	864	832	840	900	1024	1056	1040	1056	1152
H. sync. (Dots)	96	64	40	64	108	72	128	120	80	64
H. back porch (Dots)	48	96	128	120	54	128	88	64	160	224
H. active (Dots)	640	640	640	640	720	800	800	800	800	832
H. front porch (Dots)	16	64	24	16	18	24	40	56	16	32
Vertical Freq. (Hz)	59.940	66.667	72.809	75.000	70.087	56.250	60.317	72.188	75.000	74.553
Sync. Polarity	−	−	−	−	+	+	+	+	+	−
V. total (Lines)	525	525	520	500	449	625	628	666	625	667
V. sync. (Lines)	2	3	3	3	2	2	4	6	3	3
V. back porch (Lines)	33	39	28	16	35	22	23	23	21	37
V. active (Lines)	480	480	480	480	400	600	600	600	600	624
V. front porch (Lines)	10	3	9	1	12	1	1	37	1	3

Mode No.	11	12	13	14	15	16	17	18	19	20
Mode Name	VESA 848 x 480	VESA 1024 x 768	VESA 1024 x 768	VESA 1024 x 768	VESA 1280 x 720	480p (Video)	720p (Video)	1080i (Video)		
Horizontal Freq.(KHz)	29.830	48.363	56.476	60.023	44.772	31.47	44.95	33.72		
Video clock Freq.	31.50	65.000	75.000	78.750	74.5	27.00	74.175	74.175		
Sync. Polarity	−	−	−	+	−	−	+	+		
H. total (Dots)	1056	1344	1328	1312	1664	858	1650	2200		
H. sync. (Dots)	80	136	136	96	128	62	40	44		
H. back porch (Dots)	104	160	144	176	192	60	220	148		
H. active (Dots)	8484	1024	1024	1024	1280	720	1280	1920		
H. front porch (Dots)	24	24	24	16	64					
Vertical Freq. (Hz)	59.659	60.004	70.069	75.029	59.855	59.94	59.94	29.97		
Sync. Polarity	+	−	−	+	+	−	+	+		
V. total (Lines)	500	806	806	800	748	525	750	562		
V. sync. (Lines)	5	6	6	3	5	6	5	5		
V. back porch (Lines)	12	29	29	28	20	30	20	15		
V. active (Lines)	480	768	768	768	720	480	720	540		
V. front porch (Lines)	3	3	3	1	3					

2.5 DDC Contents

a. HDMI 256 bytes EDID code. (For DVR4240 TA CA (Toshiba))

EDID block0: Rev:01

	0	1	2	3	4	5	6	7	8	9
0	00	FF	FF	FF	FF	FF	FF	00	52	62
10	40	42	01	01	01	01	03	10	01	03
20	80	5D	34	78	2A	30	31	A2	55	4C
30	A9	25	0E	45	4A	20	00	00	01	01
30	01	01	01	01	01	01	01	01	01	01
50	01	01	01	01	1A	1D	00	80	51	D0
60	1C	20	40	80	35	00	A2	08	32	00
70	00	1C	00	00	00	FE	00	54	6F	73
80	68	69	62	61	0A	20	20	20	20	20
90	00	00	00	FD	00	32	4B	1E	50	0E
100	00	0A	20	20	20	20	20	20	00	00
110	00	FC	00	34	32	48	4D	36	36	0A
120	20	20	20	20	20	20	01	62		

EDID block1:

	0	1	2	3	4	5	6	7	8	9
0	02	03	1A	71	47	84	05	02	03	01
10	06	07	23	09	07	07	83	01	00	00
20	65	03	0C	00	10	00	01	1D	00	72
30	51	D0	1E	20	6E	28	55	00	A2	08
40	32	00	00	1E	01	1D	80	18	71	1C
50	16	20	58	2C	25	00	A2	08	32	00
60	00	9E	8C	0A	D0	8A	20	E0	2D	10
70	10	3E	96	00	A2	08	32	00	00	18
80	8C	0A	D0	8A	20	E0	2D	10	10	3E
96	96	00	A2	08	32	00	00	18	00	00
100	00	00	00	00	00	00	00	00	00	00
110	00	00	00	00	00	00	00	00	00	00
120	00	00	00	00	00	00	00	B9		

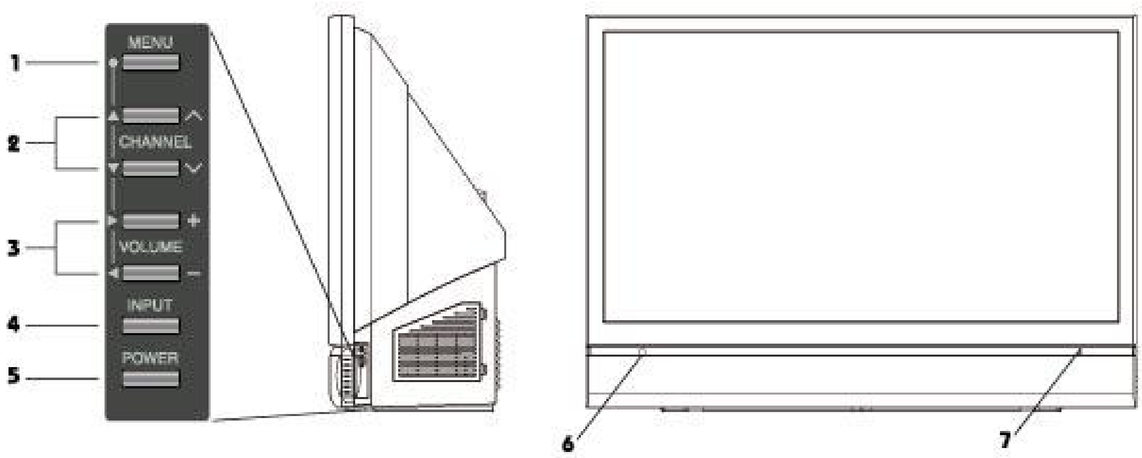
2.6 HDMI-HDCP test

1. Create HDCP key:
   - The "***.dat**" files need buy from "Digital Content Protection LLC" (WWW.digital-cp.com)
   - To execute this program to create "***.HEX**".
2. Install HDCP key to TV.
   a. To execute ***GProbe 4.exe***
   b. Select ***Commends*** to ***DebugON*** then press ***Enter***
   c. Select ***Commands*** to ***SetBuffer address= 0X600 length=300*** then press ***Enter***
   d. Select ***Commands*** to ***NVRAMWrite*** then input the file of factoryxxx.hex (HDCP keys) from address=0
   e. Set ***Commands*** to ***NVRAMRead address=0 length=300***
3. With "VG848 or VG858" HDCP program to check the TV set HDCP function.

3. Front Panel Function Control Description

3.1 User control

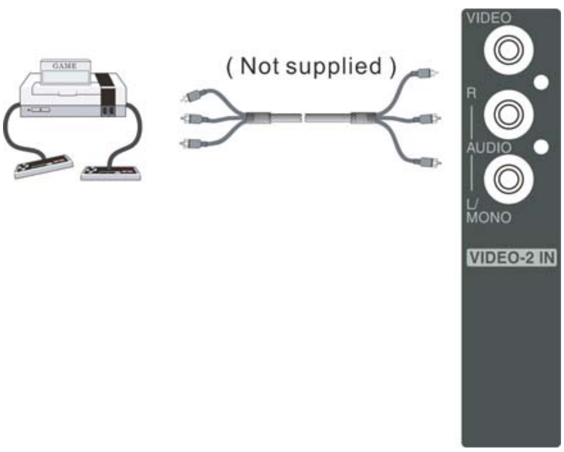
The front of the display shall provide user access to basic functionality and OSD functionality. The front user controls shall follow the format shown below:



1. Menu	Turn OSD Menu ON/OFF
2. Channel up / down	Channel up/down when Input is TV or highlight a control while in the OSD Menu.
3. Volume + / -	Increase/Decrease sound volume or adjust a highlighted control while in the OSD Menu.
4. Input	Select Active Video Input or choose a selection while in the OSD MENU.
5. Power Button	Power ON/OFF
6.IR Lens	IR Receiver
7.LED Lens	"Power "LED" & "LAMP LED" indicator.

Side view of RPTV

A front panel A/V interface panel shall be located on a tilt out door on the left side of the display. The interface shall consist of jacks to provide connection to audio / video. The front input connectors located as below:



Rear interface:
The main interface for the display shall be on the back of the unit. The interface shall consist of jacks for tuner input, audio, video interfaces and HDMI interfaces. The rear connectors shall be located as shown below:

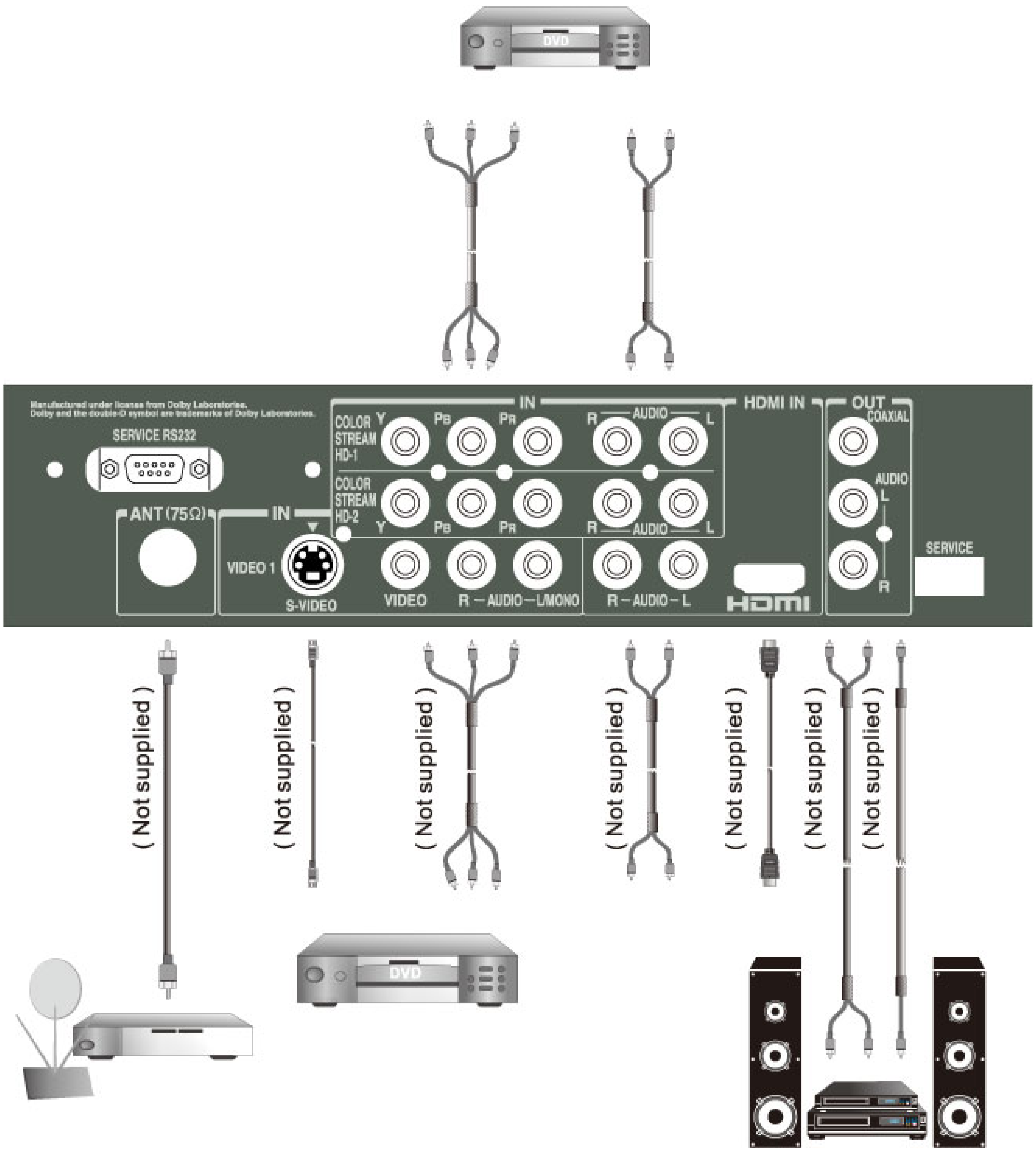
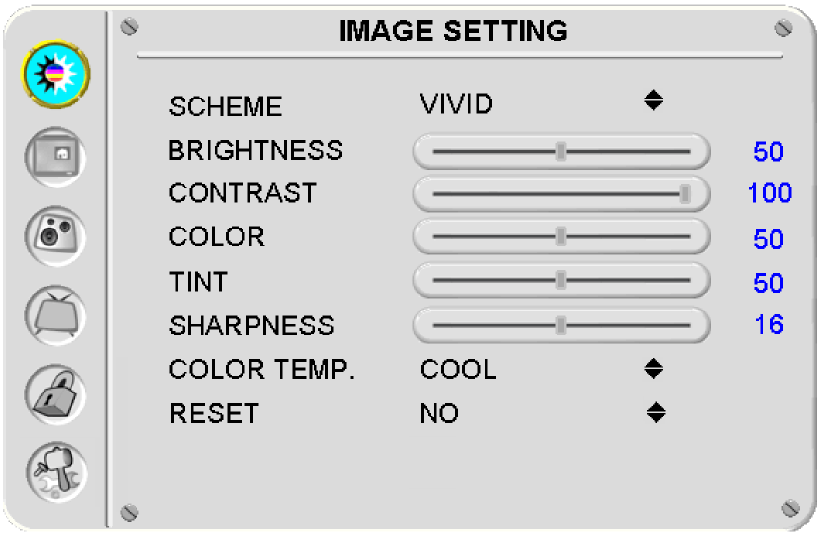


FIG.13

3.2 OSD Functions

All the OSD function settings are controlled either by the remote control or using the control keys on the right side of RPTV.

To display the OSD main menu, press the Menu button on the right side of the RPTV or on the remote control. Use ▲ ▼ arrow keys to highlight the desired OSD sub-menu.



Main Menu

To select a sub-menu, press ► on the right side of the RPTV or the ► key on the remote control.

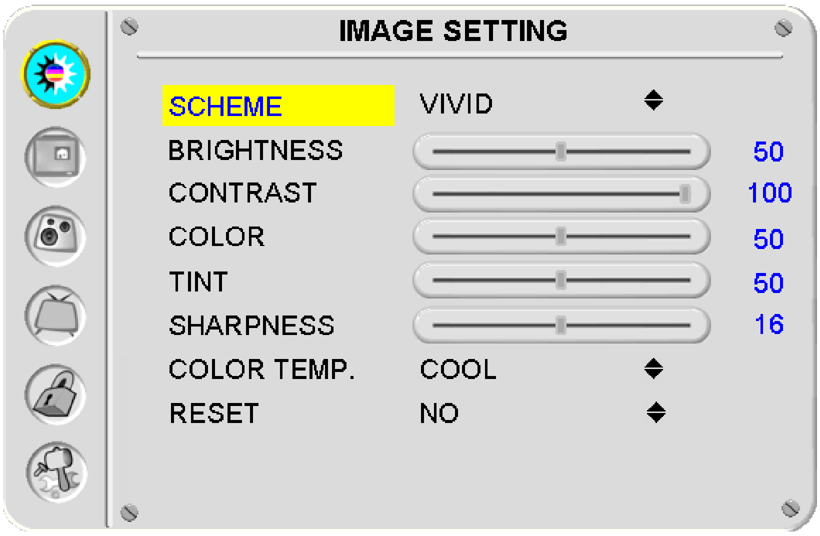
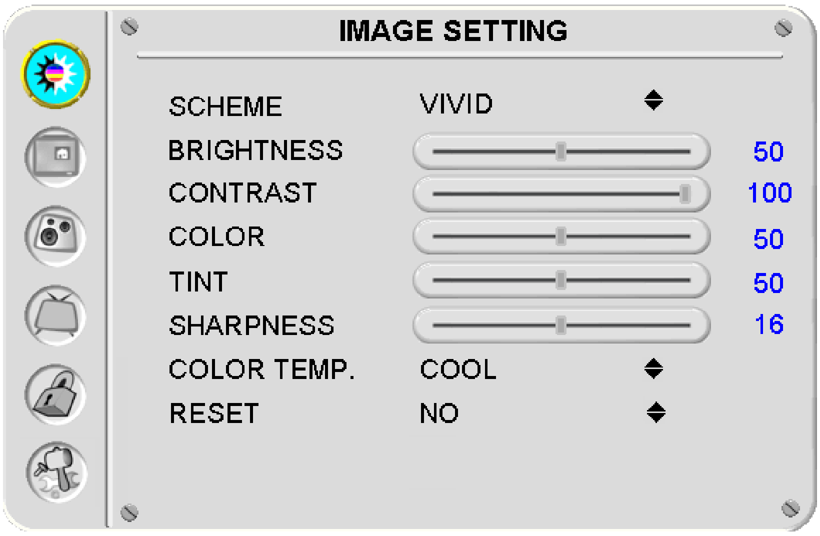
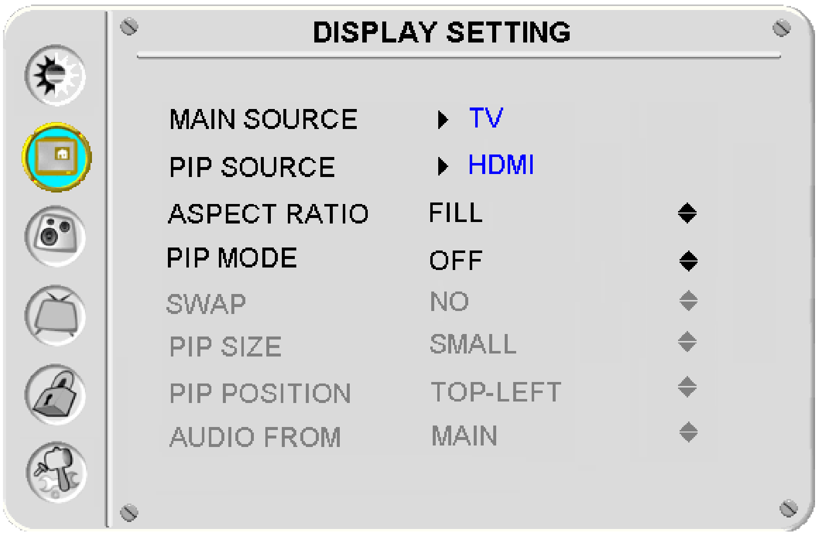


IMAGE SETTING:



Function Name	Function
Scheme	USER→ VIVID → DIMMER → GAME → SPORT
Brightness	Brightness adjustment
Contrast	Contrast adjustment
Color	Saturation adjustment
Tint	Hue adjustment
Sharpness	Sharpness adjustment
Color Temp	Color temperature adjustment (Cool, Medium, Warm)
Reset	Reset video settings

DISPLAY SETTING:

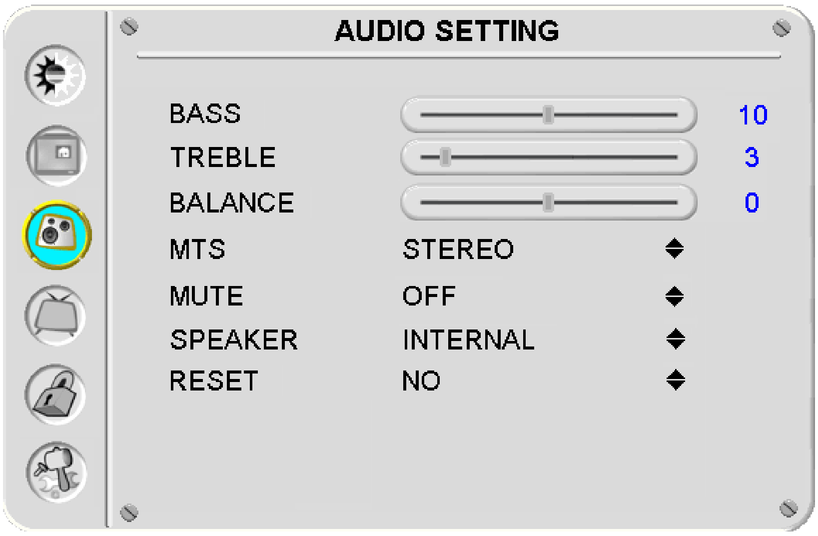


Function Name	Function
Main Source	Select main screen sources TV→DTV→AV1→AV2→S Video→Color Stream HD-1 →Color Stream HD-2→HDMI
PIP Source	Select sub screen sources See PIP/PBP/POP specification in Table 1 (PIP function list)
Aspect Ratio	Set display to "STANDARD" / "FILL" / "ZOOM"
PIP Mode	OFF→PIP→PBP→POP
Swap	Swap main screen and sub-screen source
PIP Size	Sub-screen display size adjustment (Small→Medium→Large)
PIP Position	Sub-screen display horizontal/vertical position adjustment
Audio From	Select main screen or sub-screen audio sources

Table 1: PIP function list

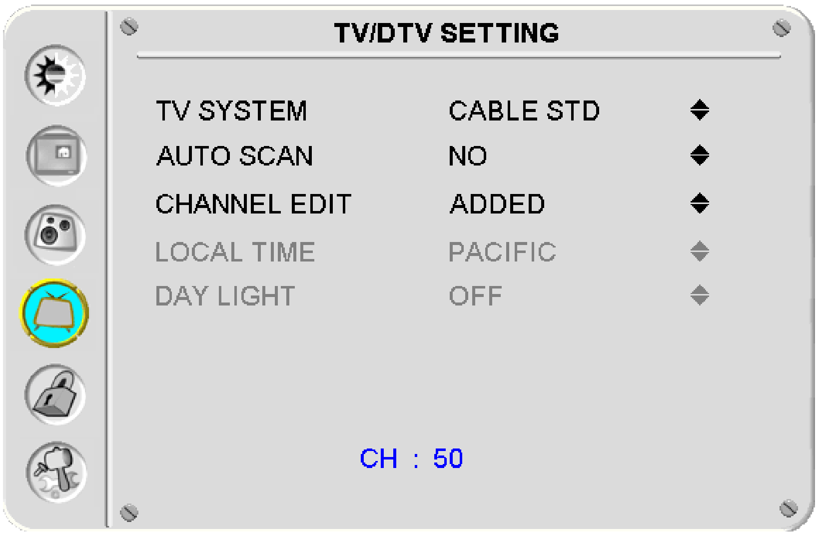
Main \ SUB	TV	AV1	AV2	S-Video	Color Stream HD-1	Color Stream HD-2	HDMI
TV	X	X	X	X	X	X	O
AV1	X	X	X	X	X	X	O
AV2	X	X	X	X	X	X	O
S-Video	X	X	X	X	X	X	O
Color Stream HD-1	X	X	X	X	X	X	O
Color Stream HD-2	X	X	X	X	X	X	O
HDMI	O	O	O	O	O	O	X

AUDIO SETTINGS:



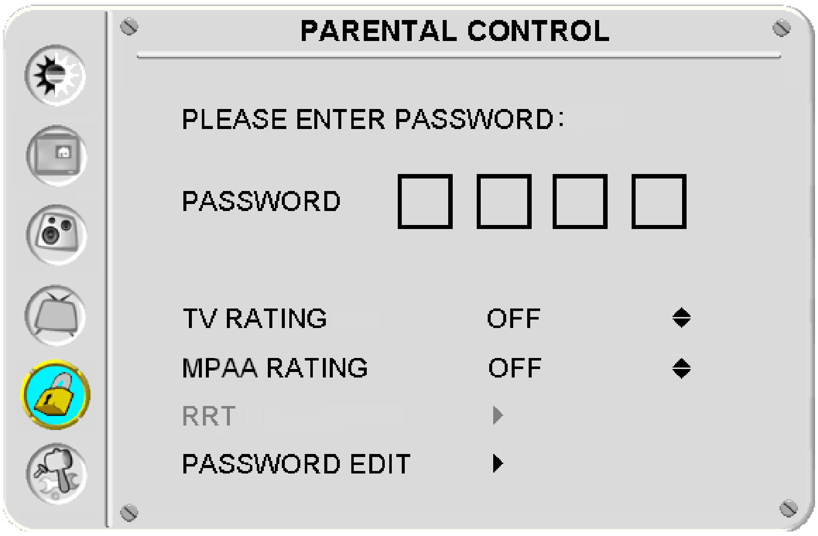
Function Name	Function
Bass	Bass adjustment
Treble	Treble adjustment
Balance	Balance adjustment
MTS	MTS Selection NOTE: This function depends on the type of broadcast being received.
Mute	Select Audio OFF or ON
Speaker	Select internal or external speaker
Reset	Reset audio settings

TV/DTV SETTINGS:

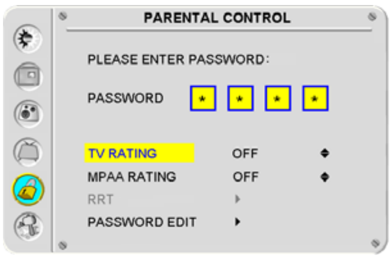
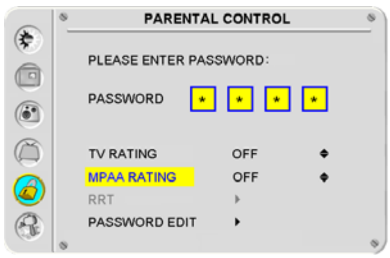


Function Name	Function
TV System	Select TV source type (ANTENNA→ Cable STD→ Cable HRC → Cable IRC)
Auto Scan	Automatically detect available TV channels
Channel EDIT	Add/Delete the selected TV channel
Local Time	
Day Light	

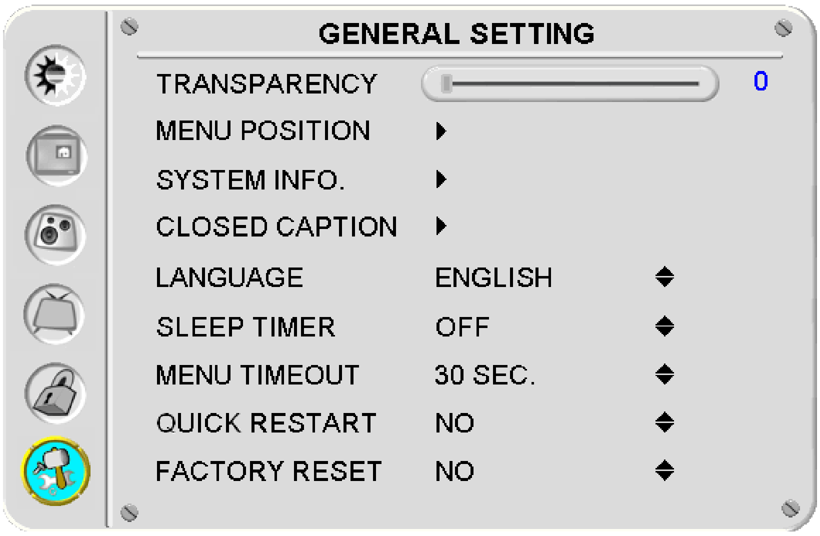
PARENTAL CONTROLS:



Function Name	Function
Password	Turn parental control OFF or ON
TV PG Rating	See next page
MPAA Rating	See next page
RRT	Open V-chip function
Password EDIT	Change Password (see next page)

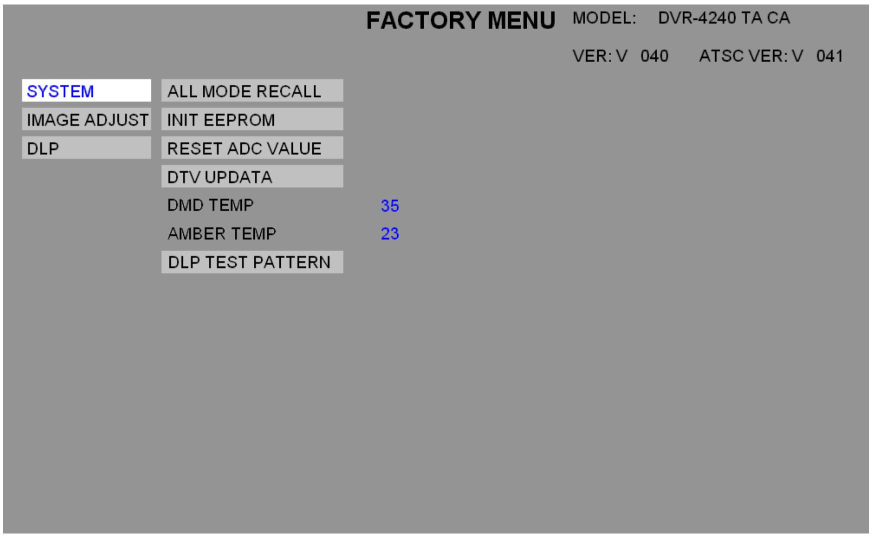
TV PG Rating		**TV Y:** All children **TV Y7:** For older children **TV G:** General audience **TV PG:** Parental guidance suggested **TV 14:** Parents strongly cautioned **TV MA:** Mature audience only
MPAA Rating		**NONE:** Not available **G:** General audience **PG:** Parental guidance suggested **PG-13:** Parents strongly cautioned **R:** Restricted **NC 17:** No one 17 and under admitted **X:** Adult audience only
Password Edit		Change Password

GENERAL SETTINGS:



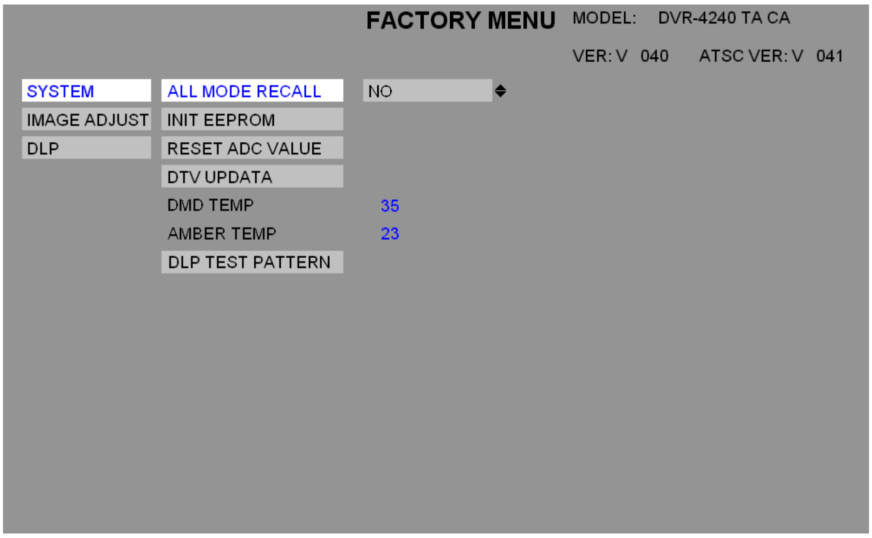
Function Name	Function
Transparency	Set OSD transparency level
Menu Position	OSD horizontal/vertical position adjustment
System Info	Display Input source, type and signal
Closed Caption	Turn the Close Caption OFF or CC1, CC2, CC3, CC4, TEXT1, TEXT2, TEXT3, TEXT4
Language	OSD language selection.
Sleep Timer	Set sleep timer to turn off the power automatically.
Menu Timeout	Set the time to turn off the OSD automatically.
Quick Restart	Low Power Shutdown (LPS) mode selection
Factory Reset	Restore factory default settings

Factory Menu



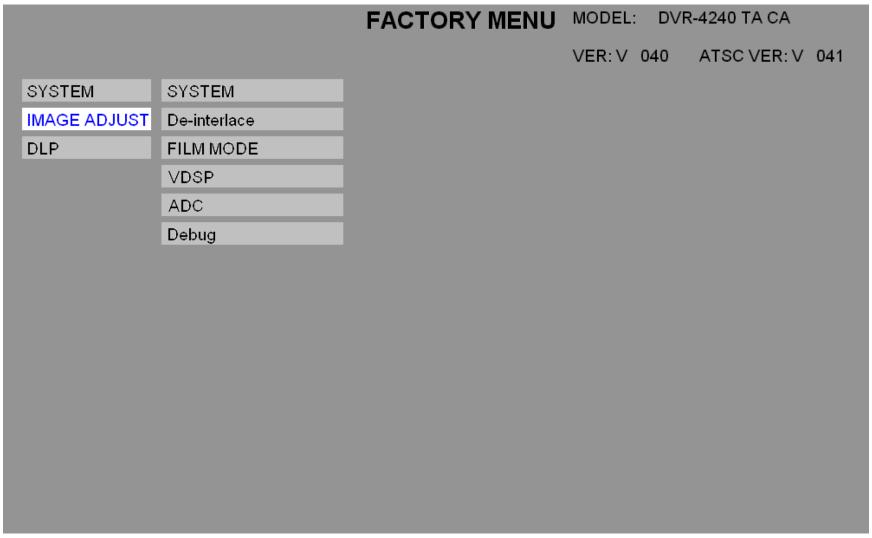
Function Name	Function
MODEL:	TV system model name in factory used.
VER:	TV system software version.
ATSC VER:	ATSC software version.
SYSTEM	Initial TV system/ DTV software update/ Temperature information
IMAGE ADJUST	TV system image/ color/ white balance adjustment.
DLP	DLP function control.

Factory Menu- System



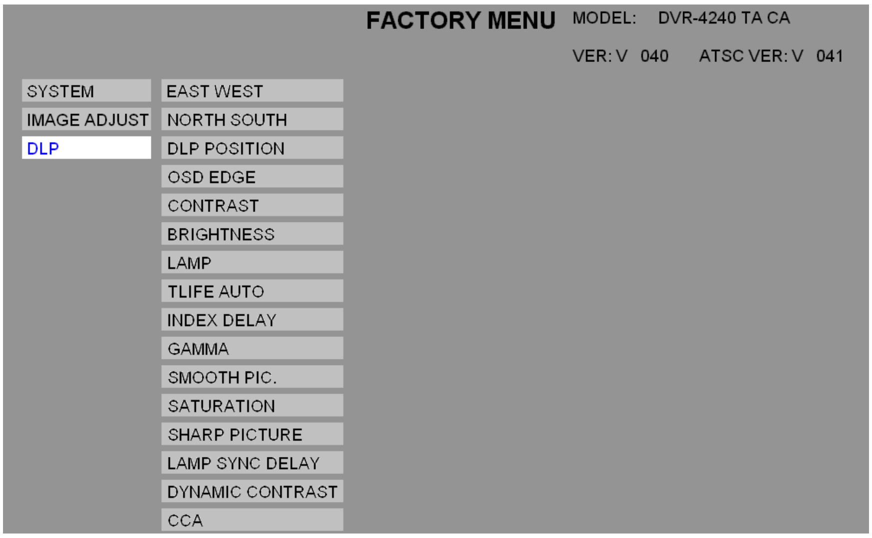
Function Name	Function
ALL MODE RECALL	TV system reset to factory shipment setting.
INIT EEPROM	Clear EEPROM. All adjustment will be clear.
RESET ADC VALUE	White balance value reset.
DTV UPDATA	ATSC software update.
DMD TEMP	Around of DMD temperature information.
AMBER TEMP	Ambient temperature information.
DLP TEST PATTERN	DLP test pattern for factory used.

Factory Menu- Image adjust



Function Name	Function
SYSTEM	Not available.
De-interlace	Not available.
FILM MODE	Not available.
VDSP	Image quality adjustment.
ADC	White balance alignment.
Debug	Not available.

Factory Menu- DLP



Function Name	Function
EAST WEST	Image horizontal invert.
NORTH SOUTH	Image vertical invert.
DLP POSITION	Image position adjustment.
OSD EDGE	Not available.
CONTRAST	DLP contrast adjustment for cool color temperature.
BRIGHTNESS	DLP brightness adjustment.
LAMP	Lamp timer information.
TLIEF AUTO	Not available.
INDEX DELAY	Color wheel index delay adjustment.
GAMMA	Gamma curve selection.
SMOOTH PIC.	SmoothPicture™ on/off control.
SATURATION	Dynamic color function to adjust saturation.
SHARP PICTURE	Dynamic color function to adjust sharp picture.
LAMP SYNC DELAY	Lamp sync delay adjustment.
DYNAMIC CONTRAST	Dynamic color function to adjust dark level.
CCA	Not available.

4. Circuit Description

4.1 Main Board

4.1.1 Power Supply (DC/DC Converter)

1. 16V, 12V, 5VC, 5VSB id from Power Board.
2. 3V3ATZ from regulator IC203 (5VSB->3.3V)
3. 2V5DDR from regulator IC206 (5VSB->2.5V)
4. 1V8CTZ from regulator IC205 (5VSB->1.8V)
5. 5VT from regulator IC207 (12V->5V)
6. 32VT from DC-DC IC218 (12V->32V)
7. VDD_Core1V5 from DC-DC IC201 (12V->1.5V)
8. 5VA from 5VC
9. 3V3A/ 3V3HDMI from regulator IC202 (5VA->3.3V)
10. 1V8HDMI from regulator IC216 (5VA->1.8V)
11. 2V5VADC/2V5ATSC from regulator IC209 (5VA->2.5V)
12. 1V8ATSC from regulator IC214 (5VA->1.8V)
13. 3V3VDC/3V3ATSC from regulator IC211 (5VA->3.3V)
14. 1V2VDC from regulator IC215 (5VA->1.2V)

4.1.2 Image Processor

The Genesis Microchip FLI8532 (IC404) is a fully integrated single chip solution for LCD TV. It includes an integrated 3-D Digital Video Decoder with Faroudja DCDi Cinema video format conversion, video enhancement, and noise reduction. The level of video quality that could previously only be seen on an exclusive Faroudja Home Theater System is now available in a single chip solution.

The auto-detection and Faroudja DCDi Cinema technology allow the FLI8532 to detect, process, and enhance any video or PC graphic format worldwide without the need for additional hardware.

The integrated VBI dataslicer and decoder allow for significant cost reduction by removing the need for expensive, external VBI dataslicers and decoders. The FLI8532 supports many worldwide VBI standards for applications of Teletext, Closed Captioning, V-Chip, and other VBI technologies.

An embedded micro-controller and a versatile OSD in a single device will facilitate rapid development of a reliable and attractive product.

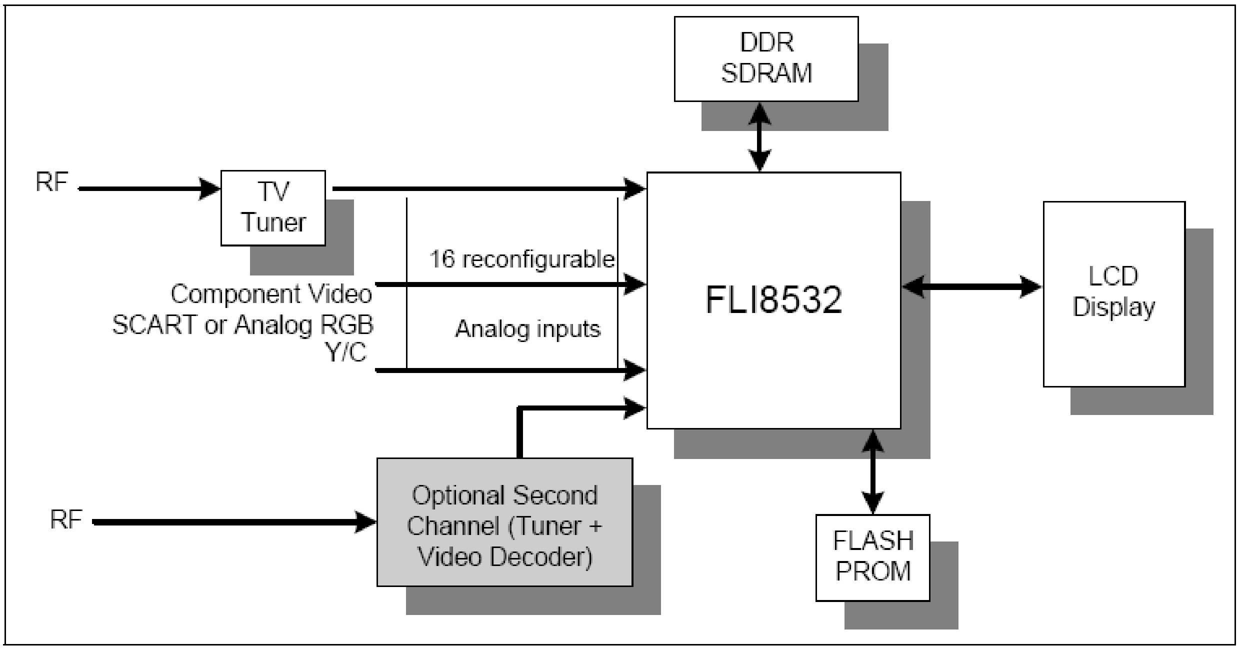


Figure 1. Single Channel System Design Example

4.1.3 Digital Video Format Converter

The FLI8532 (IC404) is a highly integrated digital video format converter for LCD-TV application using patented de-interlacing and post processing algorithms from Faroudja Laboratories, coupled with highly flexible scaling, a wide variety of aspect ratio conversions, and other special video enhancing features to produce the highest quality image.

Inputs

- Input all industry standard and non-standard video resolutions, including 480i (NTSC), 480p, 720p, 1080i.
- Digital input, 8-bit Y/Cr/Cb (ITU-R BT656), 8-bit Y/Pr/Pb, 16-bit Y Cr/Cb (ITU-R BT601), 24-bit RGB, YCrCb, YprPb

Outputs

- Output resolutions include 480p, 720p,1080i, 1080p.
- Interlaced or Progressive output
- In the FLI8532, digital output of 24-bit RGB, YCrCb, YPrPb (4:4:4), or 16/20-bit Y Cr/Cb(4:2:2) are available
- Output pixel rate up to 135 MHz maximum

Formats

- Input color manipulation matrix supports all color spaces: RGB, YPrPb, 4:4:4 YCrCb, 4:2:2 YCr/Cb, ITU-R BT656, ITU-R BT601
- Output supports digital RGB, YPrPb, 4:4:4 YCrCb and 4:2:2 YCr/Cb

Frame Rate Conversion

- Tearless Frame Rate Conversion 50/60/72/75/100/120 Hz

Front End Processing

- Motion Adaptive Noise Reduction – Improves picture quality for off-air material.
- Cross Color Suppressor (CCS) - Removes cross color artifacts in composite video signals due to poor Y/C separation in standard 2-D video decoders, eliminating the need for expensive 3-D video decoders.

4.1.4 Video Decoder

The FLI8532 chip has a sophisticated Analog Front End with 16 reconfigurable inputs through an analog multiplexer to anti-alias filters before the Analog to Digital Converters (ADCs). These integrated features eliminate the need for any devices between the input connector and the pin of the FLI8532.

The figure above depicts the data-path for the AFE and Decoder blocks with connections to the input multiplexer that selects whether the data follows the Main Video Channel or PIP video channel.

The analog front end of FLI8532 provides the capability to capture 16 analog video inputs which can be a combination of Composite (CVBS), S-Video (SY, SC), YPrPb (Y, Pr, Pb) or RGB (R, G, B).

The FLI8532 front end provides filtering capability depending on the type of input video signal in use. The use of these filters eliminates the need to have any external filter components. The filters included are both in the analog as well as digital domain. The digital filter eases the design requirement of the analog anti-aliasing filter.

The analog filter is implemented with the following 3dB cutoff definition.

10 MHz – for SDTV

20 MHz – for 480p/576p

40 MHz – for 720p/1080i

180 MHz – for Graphics

The digital filters are implemented as Quarter Band (QB), for SDTV and 480p/576p and as Half Band (HB), for 720p/1080i modes.

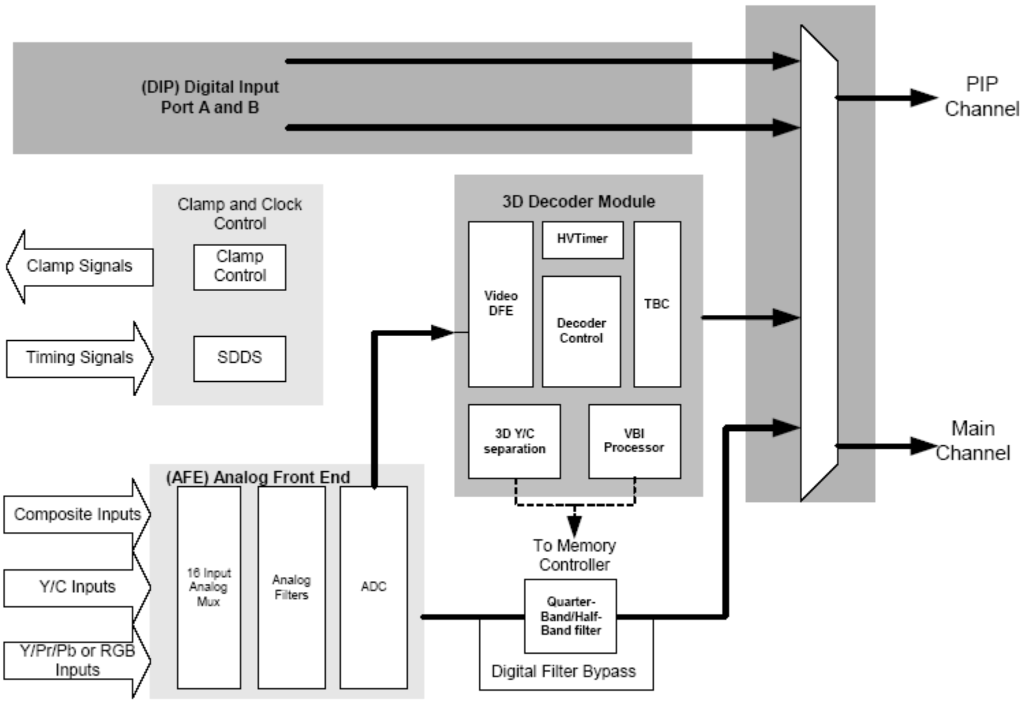


Figure 11. Analog Front End

4.1.5 Audio Processor

The MSP3445 is single-chip multi-standard sound processor of NTSC analog TV standard. The full TV sound processing, starting with analog sound IF signal-in, down to processed analog AF-out, is performed in a single chip.

This TV sound processing IC include version for processing the multi-channel television sound (MTS) signal conforming to the standard recommended by the Broadcast Television System Committee (BTSC). Current IC have to perform adjustment procedures in order to achieve good stereo separation for BTSC. The MSP3445 has optimum stereo performance without any adjustment.

The MSP3445 has built-in automatic function: The IC is able to detect the actual sound standard automatically (Automatic Standard Detection). Furthermore, pilot levels and identification signals can be evaluated internally with subsequent switching between mono/stereo/bilingual; no I^2C interaction is necessary (Automatic Sound Selection). The IC also include the Bass and Treble function.

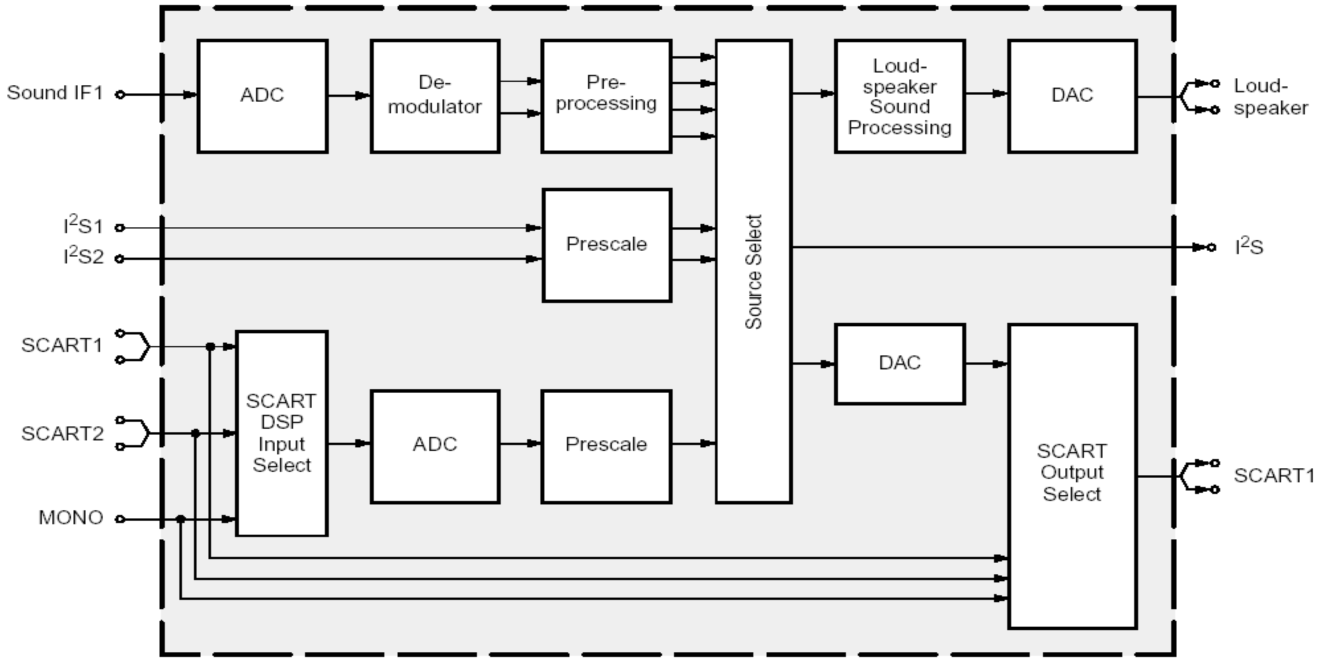
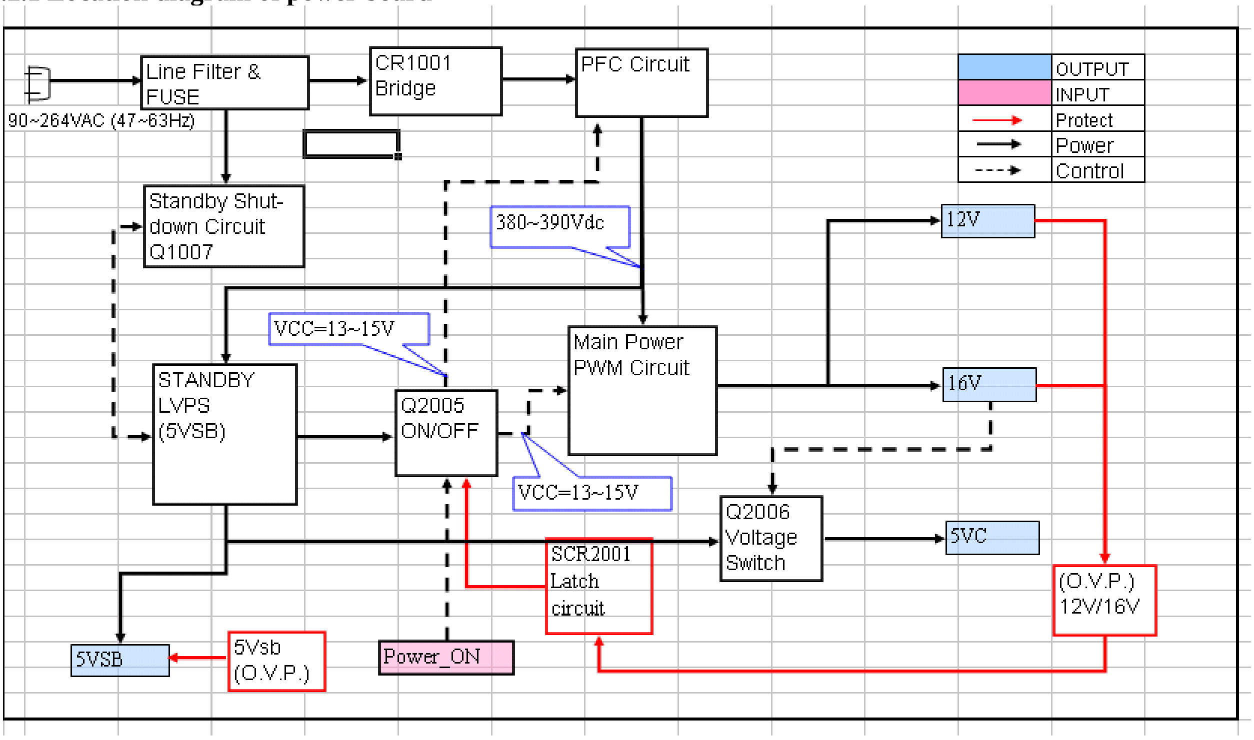


Fig.4.1.5 : Simplified functional block diagram of MSP 34x5G

4.2 Power Supply Circuit Description

The power supply provides DC electrical power to all the electrical components in the rear projection television. DVR-4240 also contains Ballast that provides high voltage 380V necessary to strike the lamp when the rear projection television is powered up. The attached fan draws cooling air through the power supply, as well as through the rest of the rear projection television.

4.2.1 Location diagram of power board



The power supply consists of the EMI filter, PFC, Standby power, and Main power. The system required voltage is converted from the Standby and Main power, and the high voltage DC 380V from PFC is applied to the lamp and Main power.

Line voltage can directly input from 90Vac to 264Vac and boost to 380Vdc for the output, there are common choke FL1001 and FL1002, and CX1001, CX1002 capacitors to form an EMI filter that can reduce noise and interference.

PFC is main for shaping the AC input line current waveform to correspond to that of the AC input line voltage, and boost input rectified voltage to 380Vdc for prerequisite.

The output voltage 5Vsb and 5VC are converted from Standby power, when the system is going to the standby mode, 5Vsb is the only output voltage. After the “Power_ON” (CN2002 Pin1) is high, then other voltage outputs are starting up, otherwise there is only 5Vsb. The 5VC output via Q2006 and under control by 16V depend on Main Power start up, the other outputs voltage +12V, +16V are converted from Main power. They are the main electrical power for whole electrical system.

Short circuit protection

All voltage outputs shall have short circuit protection. Only 5Vsb output shall be auto recovery after the short condition removed.

Over voltage protection

All voltage outputs shall have over voltage protection, 6.24V for 5.25V on 5Vsb outputs; 14.9V for 12V on 12V outputs; 16V will go follow 12V protection; 415V for 380V output.

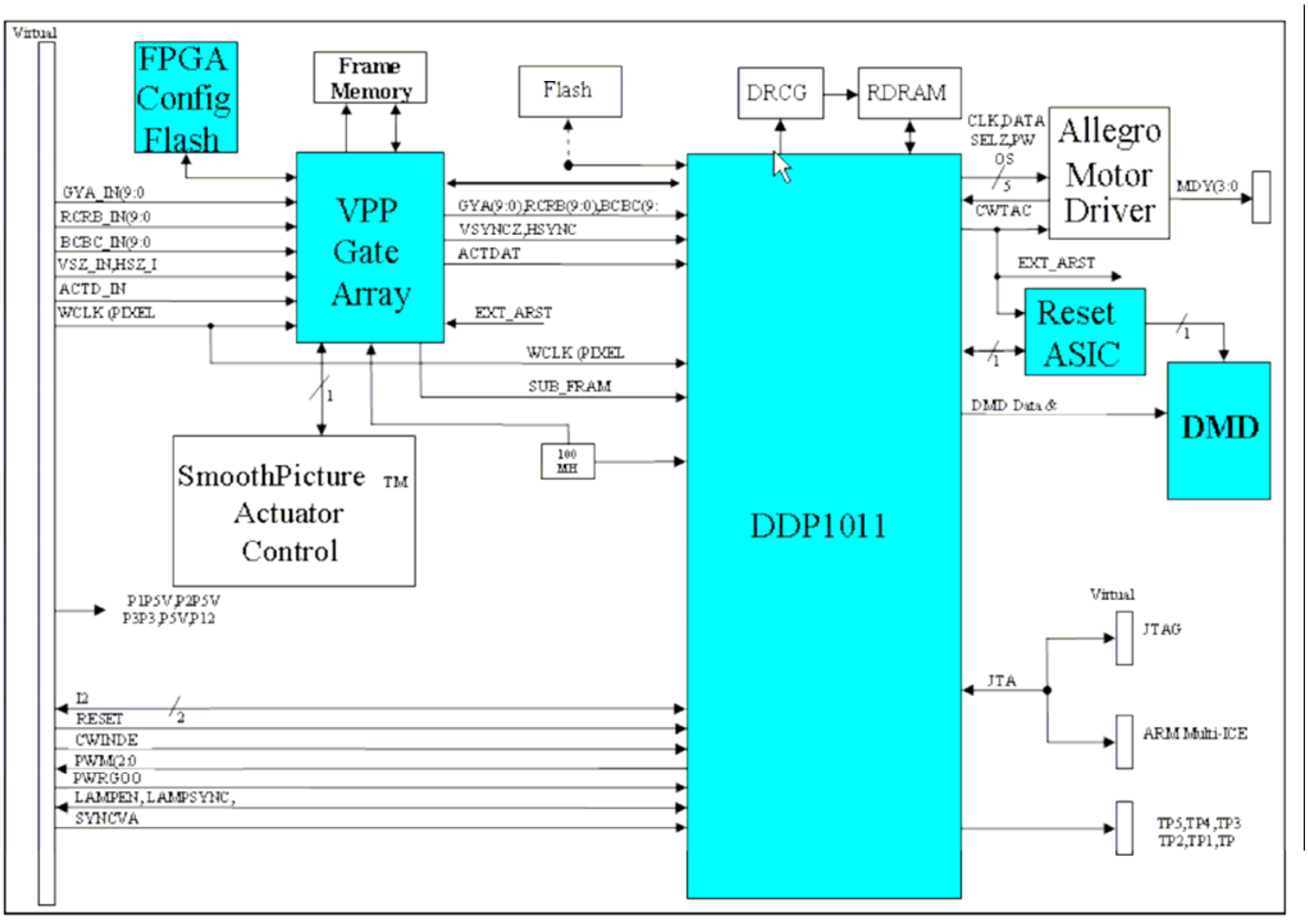
Under voltage protection

All voltage outputs shall have under voltage protection, besides +/-20V and 380V outputs (4.12V for 5.1V on 5Vsb outputs, 9.7V for 12V on 12V outputs.)

4.3 Formatter Board Circuit Description

The HD5 SmoothPicture™ Single DDP1011 component set provides a highly integrated, high performance DLP solution, which enables manufacturers to create 16:9 picture sizes, with high brightness rear projectors. When combined with external video processing circuitry, the component set provides all the necessary electronics to process video/graphics input signals, format input data for display on a DLP™ device, and control some of the auxiliary functions of the projector system.

The majority of the circuitry in the HD5 SmoothPicture™ Single DDP1011 reference design is high-speed digital, LVTTL. High speed digital circuitry includes a single 30-bit input data interface, a SDRAM interface, a Direct Rambus_ memory channel and a high speed LVDS DMD interface. The HD5 SmoothPicture™ Single DDP1011 reference design also includes analog circuitry for color wheel motor drive, SmoothPicture™ actuator Control and DMD drive voltage generation. Proper layout of the high-speed digital and analog circuits is critical to insure a working design.



4.3.1 DDP1011

The DDP1011 (IC9016) is an Application Specific Integrated Circuit (ASIC) intended for use in DLPTM (Digital Light Processing Technology from Texas Instruments) system applications. The DDP1011 provides selected Video/Graphics Processing, DMD Data Formatting, Real Time System Control (RSC), and ARM Micro-processor control. The DDP1011 is designed to work in conjunction with a single 128Mbit or 256Mbit RDRAM™ (Direct RAMBUS(TM) DRAM) and an associated Direct RAMBUS™ Clock Generator (DRCG) chip. For maximum flexibility, the DDP1011 micro-controller operates entirely from a single external Flash device. This Flash provides micro-code, configuration parameters and PWM sequences.

4.3.2 DMD

0.45 inch diagonal spatial light modulator of aluminum micro-mirrors. Display resolution is 1280 columns by 720 rows in a

Diagonal Pixel Arrangement. Low Voltage Differential Signaling (LVDS) data interface, Double Data Rate (DDR). Pixel Architecture is SPD with DarkChip3™.

4.3.3 DAD1000

The DAD1000 (IC9021) DMD Power and Reset Driver provides the high-voltage power supplies and phased reset driver functions for a family of Digital Micro-mirror Devices (DMDs). The DAD1000 is programmable and controllable to meet all current and anticipated DMD requirements.

The high-voltage power supply function generates the three required DMD voltage levels: VBIAS, VRESET, and VOFFSET. These three supplies are programmed and controlled through a TTL and CMOS compatible serial interface. The DAD1000 also contains a +5 volt supply for internal logic functions and external color wheel control requirements.

The DAD1000 switches outputs between VBIAS, VRESET and VOFFSET voltage levels to form DMD reset waveforms. VBIAS may be supplied directly to the DMD to bias the border mirrors to the off state. VOFFSET is also supplied directly to the DMD as DMDVCC2. A fourth DMD power supply, DMDVCC, is supplied directly to the DMD by other circuitry.

4.3.4 CYCLONE

SmoothPicture™ is a technique for storing and displacing consecutive subframes of the image to allow the complete frame of data to be projected, generating two on-screen pixels with one DMD mirror. SmoothPicture™ also significantly reduces image pixelization.

4.4 Function Key Board Circuit Description

The Function Key Board provided 7 buttons for control, chouse, select… TV function.

4.5 LED Board Circuit Description

Two LED indicate TV power and Lamp states.

4.6 IR Board Circuit Description

A Infrared Receiver embedding in IR board.

4.7 SmoothPicture™ Board Circuit Description

SmoothPicture™ Actuator Driver.

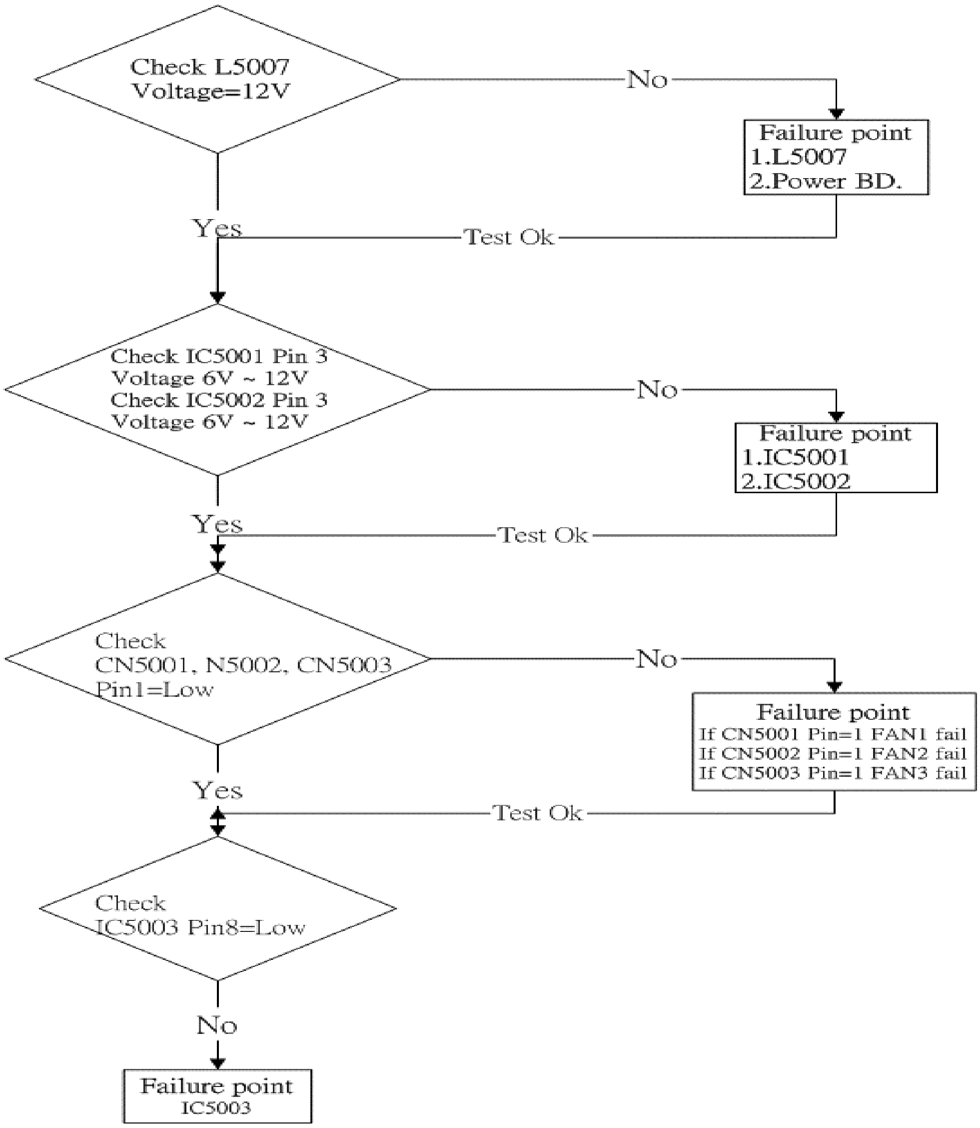
5. Trouble Shooting Flow Chart

5.1 No Display on Screen (Screen is black, no power)

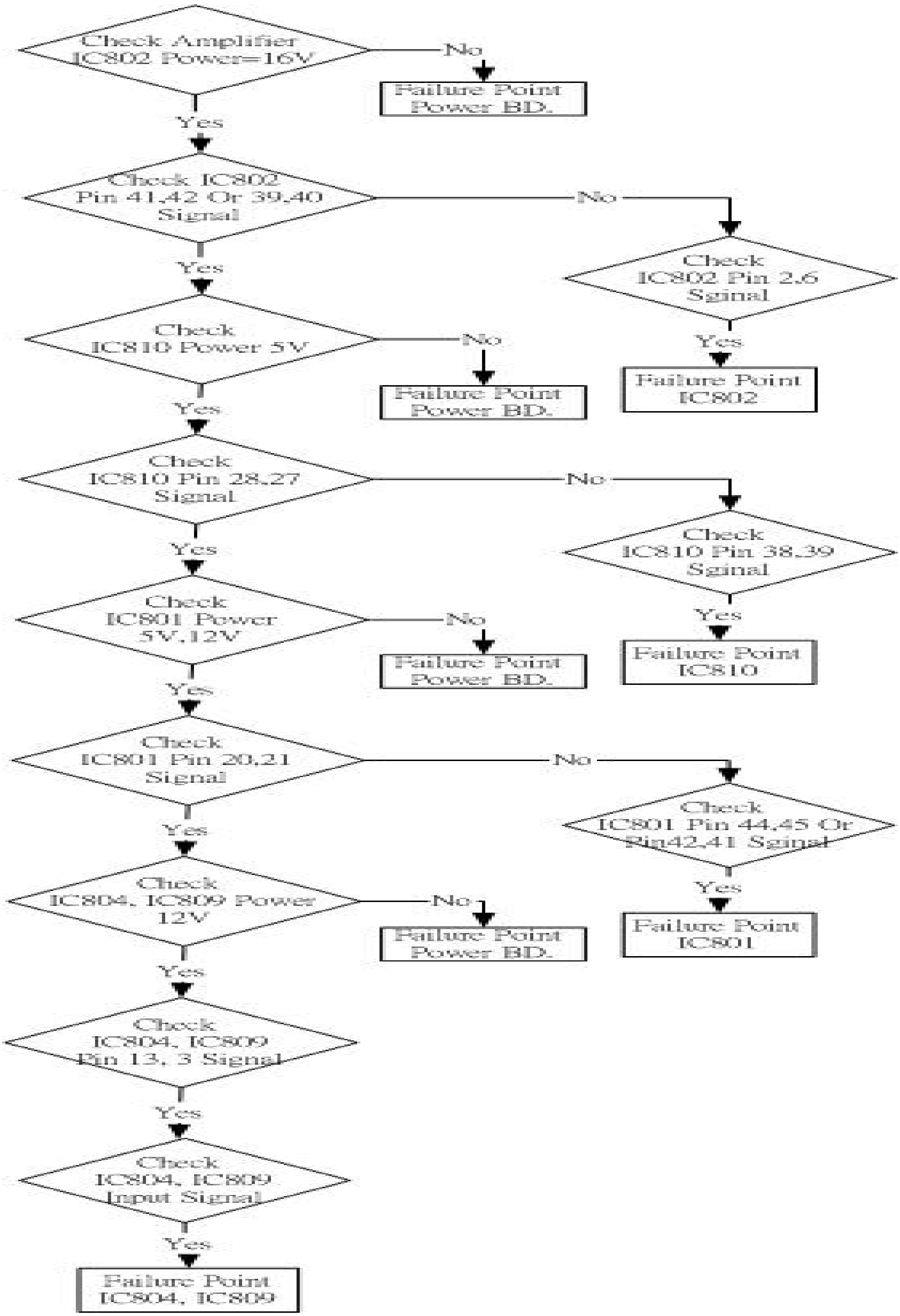
LED error message.

Error1: 2 Green, 1 Orange	LEDG: Blinking LEDO: Blinking	Hi (OFF)	Any FAN (1 or 2 or 3) failure or disconnected. After the fan detects error 5 sec, the LED shows "ERROR1" message.
Error2: 3 Green, 2 Orange	LEDG: Blinking LEDO: Blinking	Blinking (0.5sec)	Lamp ignition failure, Lamp shut off unexpectedly. The system will shout down main power go to standby mode.
Error3: 5 Green, 2 Orange	LEDG: Blinking LEDO: Blinking	Hi (OFF)	DLP hardware error.

1. Error 1:



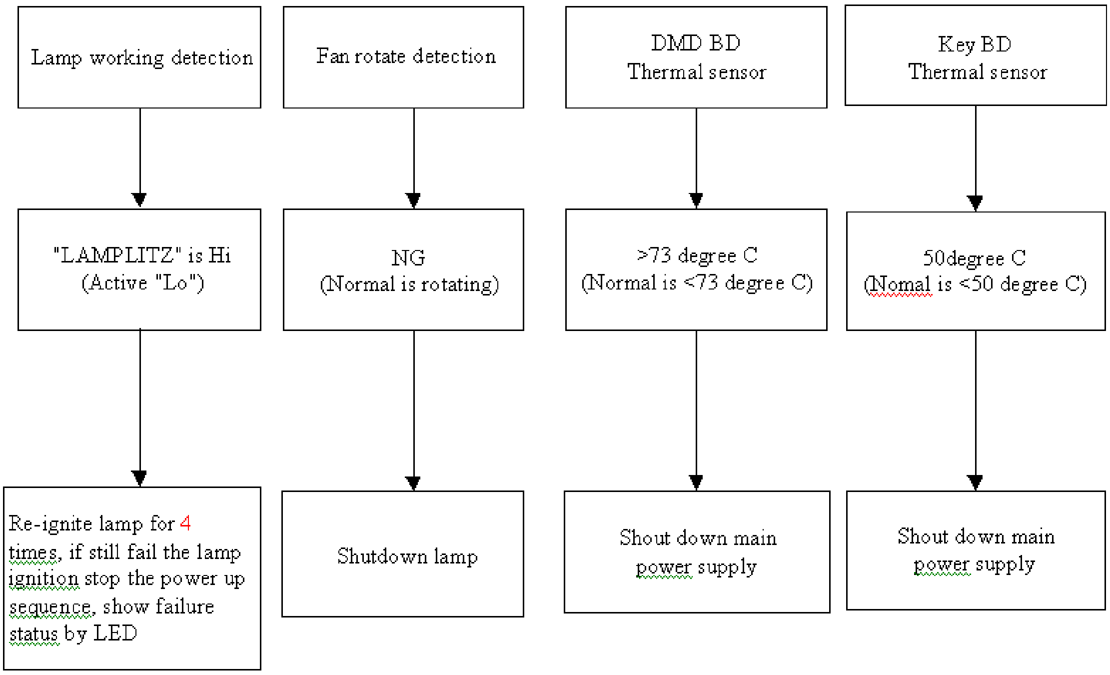
5.2 No Sound (Test signal: 0.5Vrms sine waveform)



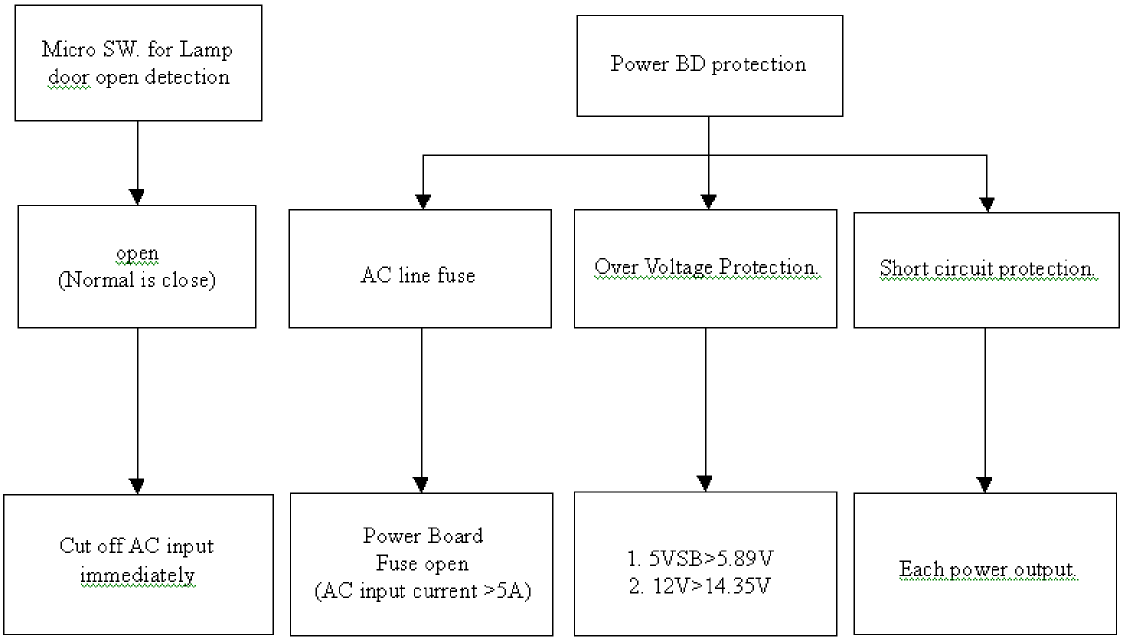
5.3 Protection

5.3.1 Protected flow chart.

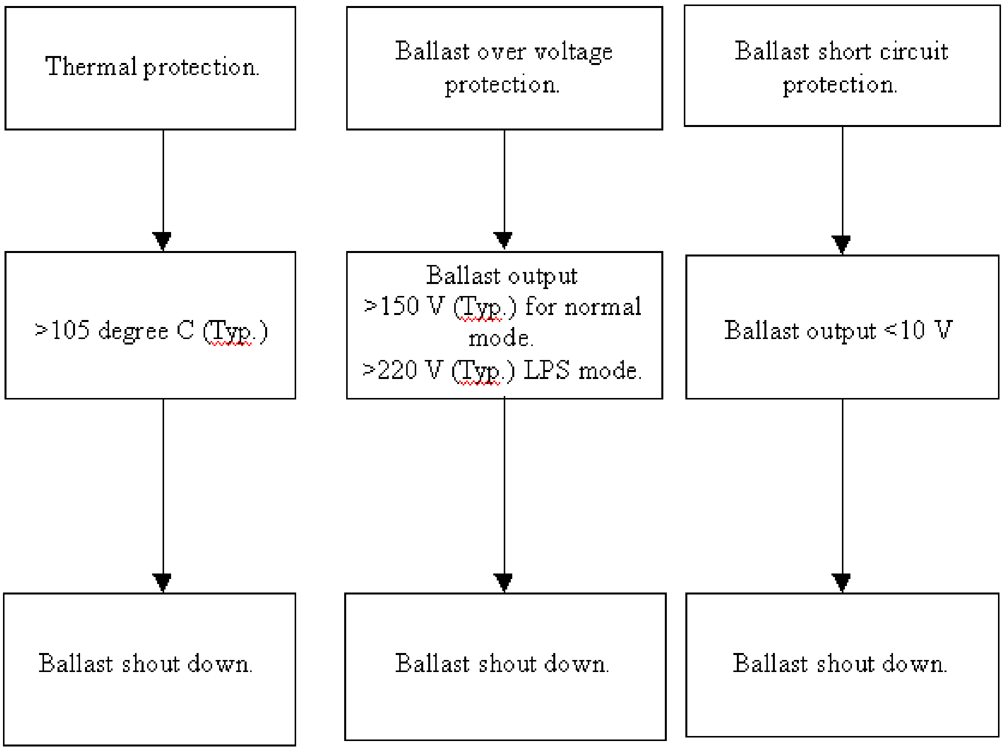
5.3.1.1 Firmware protected.



5.3.1.2 Hardware protected (Power board).



5.3.1.3 Hardware protected (Ballast board).



5.3.2 Protection functions list.

Item	Function	Description	Condition	Specification	Result	Recovery
1	Lamp working detection	MCU (IC404) detect the DMD BD. "LAMPLITZ" (pin P25) voltage level.	Normal Condition	TTL low level		
			Abnormal condition	TTL high level	MCU re-ignition the lamp for 5 times, if still fail the lamp ignition, stop the TV power up, show failure status by LED.	Remote off/on to re-start up and re-ignition
2	Fan rotate detection	MCU (IC404) detect the pin1 voltage of CN5001, CN5002 and CN5003.	Normal Condition	TTL low level		
			Abnormal condition	TTL high level	MCU turn off the lamp, by set the Rubycon ballast CN02 PIN4 and PIN5 to high. 1.(MCU pinP26 (LAMPSYNCEN) -->CN404 pin28-->DMD BD CN9002 pin28-->Q9004/Q9003(buffer)-->Ballast pin4(Lamp Enable set to high); 2.(MCU pinP24 (LAMPPWR) -->CN404 pin10-->DMD BD CN9002 pin10-->Q9005-->Ballast pin5(ECO-LPS set to high))	Remote off/on to re-start up

3	DMD board thermal sensor	MCU (IC404) read the DMD board IC9007 temperature via I2C bus.	Normal Condition	<=73 degree C		
			Abnormal condition	>73 degree C	MCU power off the main power supply.(MCU pinT26(POWERON)-->CN201 pin13-->Power Board CN202 pin1-->Q2005(buffer)-->Q2004/IC2004(photo coupler)-->Q1006/Q1005(VCC control for Power ICs IC1001/IC1002/IC1005))	Remote off/on to re-start up
4	Key board thermal sensor	MCU (IC404) read the Key board IC901 temperature via I2C bus.	Normal Condition	<=50 degree C		
			Abnormal condition	>50 degree C	MCU power off the main power supply.	Remote off/on to re-start up
5	Micro switch for lamp door open detection	IC2004 connect to micro switch and supply the VCC to power IC, if micro switch is open the VCC of power IC is off thus the main power supply cans not work.	Normal Condition	Door close, micro switch is on		
			Abnormal condition	Door open, micro switch is off.	Power IC no VCC, Power supply shutdown immediately.(Micro SW.-->IC2004(photo coupler)-->Q1006/Q1005(VCC control for Power ICs IC1001/IC1002/IC1005)	Remote off/on to re-start up
6	Power supply AC line fuse	F1001 serial with AC input line, if AC input current over fuse rating (5A 250V), the fuse will open immediately.	Normal Condition	AC input current <5A		
			Abnormal condition	AC input current >5A	Fuse open, no power.	AC off-->replace FUSE-->AC on-->remote on

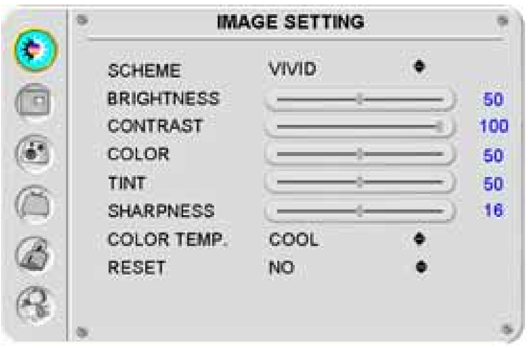
7	Power supply OVP	D2005(zener diode) connect between 12V and SCR2001, if 12V voltage over 16.42V typ. (16.05~16.79V) the SCR will turn on then cut off the VCC of power IC cause power supply shutdown.	Normal Condition	12V output <16.42V (typ)		
			Abnormal condition	12V output >16.42V(typ)	Power IC no VCC, Power supply shutdown immediately. (12V-->D2005 (zener diode) /R2018/D2006-->SCR2001-->D2014/IC2004 (photo coupler)-->Q1006/Q1005 (VCC control for Power ICs IC1001/IC1002/IC1005); SCR hold up current: 5VSB-->Q2004-->R2043-->SCR2001.	AC off/on to re-start up (AC off-->5VSB off-->SCR2001 off)
8	Power supply short circuit protection	The power IC(IC1001, IC1003, IC1005) have a input pin for current sense function, the current sense function are for error amplifier feedback loop and short circuit protection function.	Normal Condition	Transformer secondary components are no failure.		
			Abnormal condition	Any transformer secondary components are failure (winding, diode, capacitor).	Power supply into to protection state. (Power IC detect the current sense voltage at each re-start up cycle, and will auto recovery immediately after the short circuit condition remove)	AC off-->remove short circuit-->AC on
9	Thermal protection function on ballast board	TH1: 100~110 degree C (105 degree C typ)	Normal Condition	<105 degree C (typical)		
			Abnormal condition	>105 degree C(typical)	Ballast shutdown.	AC off --> Check fan status --> AC on
10	Over voltage protection function on ballast board	VL=150V(typ), range 140V~160V; VL=220V(typ) LPS mode.	Normal Condition	<150V(typ)		
			Abnormal condition	>150V(typ)	Ballast shutdown.	
11	Short circuit protection function on ballast board	VL<10V	Normal Condition	>10V		
			Abnormal condition	VL<10V	Ballast shutdown.	

6. Service adjustment

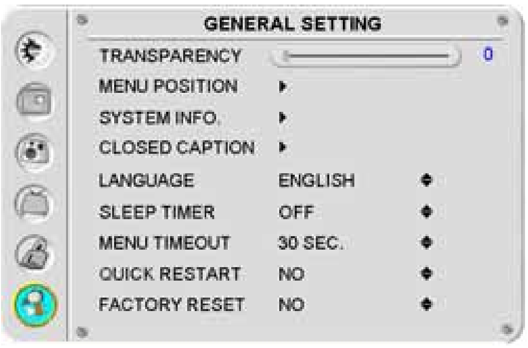
6.1 Service adjustment procedure

6.1.1 Entry Factory Menu

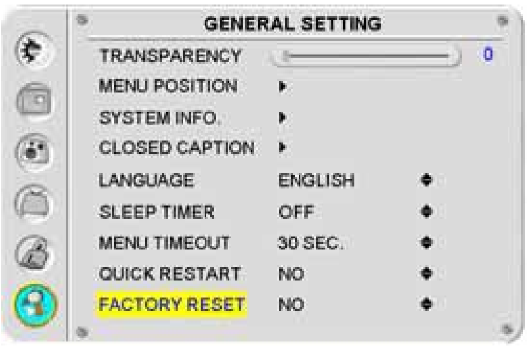
(1) Open the user menu.



(2) Select GENERAL SETTING



(3) Entry GENERAL SETTING then select FACTORY RESET



(4) Type “2”, “0”, “0” and “5” through remote control. The FACTORY MANUAL will appear



6.1.2 Index delay adjustment

(1) Before download new software or replace new module should record INDEX DELAY value. (If TV system can normally display image.)

(2) Download new software or replace new module (Main board or DMD board).

(3) Turn on the TV then entry FACTORY MENU to adjust INDEX DELAY value.

(3-1) Index delay value refer to before record value (step1). or

(3-2) Index delay value can be found from the sticker of light engine. or

(3-3) If you cannot find this sticker, please technician enter the average value" 90" and then check if the picture is ok or not.



6.1.3 DLP position

(1) Before download new software or replace new module should record DLP position value. (If TV system can normally display image.)

(2) Download new software or replace new module (Main board or DMD board).

(3) Turn on the TV then entry FACTORY MENU to adjust DLP position.

(4) The TV image should on the screen center and full screen. (Refer to section **<u>2.2.2.1.5 Distortion test</u>**)

(5) If technician cannot get the related value before replace new board, then new main board is programmed with factory average value. Technician just to check image on the screen and full screen.



6.1.4 Color temperature

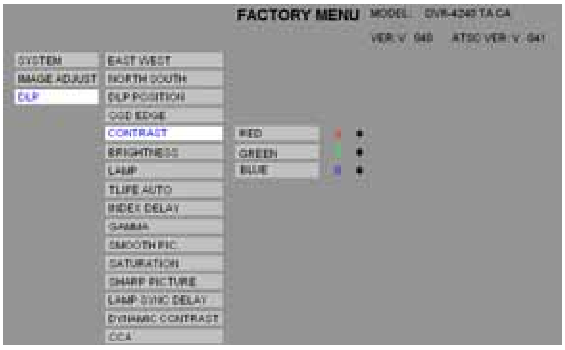
The color temperature is programmed in software. This section indicated find-turn color temperature to meet specification. Fine-turn procedure need follow step1. Adjust DLP contrast. Then adjust color2 next adjust color1 in color temperature.

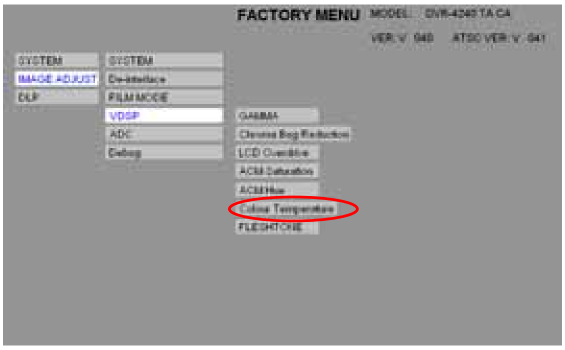
(1) Before download new software or replace new Main board module should record DLP – Contrast value & Color Temperature value. (If TV system can normally display image.)

(2) Download new software or replace new Main board module.

(3) Turn on the TV then entry FACTORY MENU to adjust DLP – Contrast & Color Temperature.

(4) If technician cannot get the related value before replace new board, then new main board is programmed with factory average value.





Note: Color Temperature has three set different value about color1, color2 and color3.

Color1= Warm; Color2= Medium; Color3= Cool

6.1.5 White balance adjustment

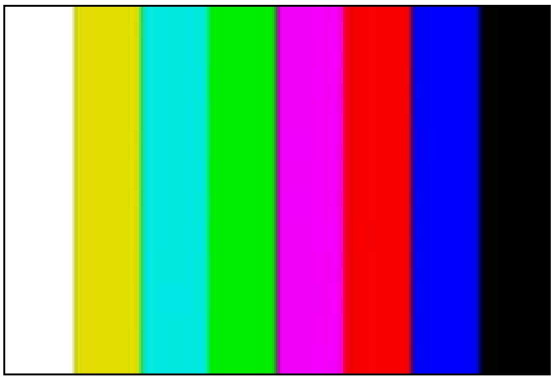
The white balance adjusted in factory before shipment. If technician re-download new software. The main board will need to do white balance adjustment with generator and 100% color bar pattern.

6.1.5.1 ADC for ColorStream HD

a. Select COLOR STREAM 1
b. Input 720p mode then do the ADC calibration (by auto alignment) at NTSC color bar 100% pattern.
c. Check black pattern (0 IRE); the luminance should be under 1 cd/m^2.
d. COLOR STREAM 2 doesn't need to do ADC calibration (The value is same as COLOR STREAM 1).

6.1.5.2 ADC for Composite signal.

a. Select AV1 and input 480i mode, NTSC color bar 100% pattern then to do ADC calibration (by auto alignment).
b. TV, AV2 and S-Video don't need to do ADC calibration (They are value same as AV1).



NTSC color bar 100%

6.2 Service Adjustment List (in Factory Mode)

Repair item	Function	Average value	Check	Remark
Engine module change but main board not changed	Position	X	yes	it's hard to promise cetering, but position, and size should ok as usual.
	Index Delay	90	yes	Index delay value will be printed on the label attached on light engine Technician can read this value and enter into this value by factory mode input. If Technician cannot find the label from engine, please use average value and test the grey scale by pattern generator. If grey scale is ok, then the value is
	ADC- color stream 1	X	X	when mainboard is not changed, these EEProm data will be not changed
	ADC- AV 1	X	X	when mainboard is not changed, these EEProm data will be not changed
	Color Temp-cool (13000k)	X	X	when mainboard is not changed, these EEProm data will be not changed
	Color Temp-Medium (9300k)	X	X	when mainboard is not changed, these EEProm data will be not changed
	Color Temp-Warm (6500k)	X	X	when mainboard is not changed, these EEProm data will be not changed
Engine module not change, but main board changed	Position	X	yes	The DMD pisition value is save on main board EEProm.
	Index Delay	90	yes	Index delay value will be printed on the label attached on light engine Technician can read this value and enter into this value by factory mode input. If Technician cannot find the label from engine, please use average value and test the grey scale by pattern generator. If grey scale is ok, then the value is
	ADC- color stream 1	programmed ok before shipment	yes	
	ADC- AV 1	programmed ok before shipment	yes	
	Color Temp-cool (13000k)	R:252, G:250.15, B:0	yes	Adjust contrast of DLP section in factory menu .
	Color Temp-Medium (9300k)	R:46, G:45, B:45	yes	Adjust color2 of color temperature of VDSP of image adjust sectoin in factory.
	Color Temp-Warm (6500k)	R:47, G:45, B:42	yes	Adjust color1 of color temperature of VDSP of image adjust sectoin in factory.

Appendix A: ISP.

A. IC502 Cortez ISP

Setting up ISP Connection for Cortez (IC502)

The following is a list of procedure that guides the user how to setup serial ISP connection for Cortez:

1. Enter OSD Select GENERAL SETTING then select to FACTORY RESET

   Use a remote control key in “2005” ,Enter factory mode use remote control Key in “3”,you can see red word “UART ON”

2. Open GProbe program. The version of GProbe software should be 4.1.0.2 or above.
3. Press “F10” key on the keyboard. A “GProbe Connection Setup” window should pop-up automatically. The configuration for Serial ISP are described as follows:

	Serial Connection
Protocol	Serial1
Port	COM1
Speed	115200

Press “OK” after configuration setting is done.

4. On the command window (at the bottom of the GProbe screen), execute the batch file called “DVR42_8Bit.txt”. The location of this file is under \DVR42\ISP\batch\ directory; therefore, the user can type the following line in the command window: batch “c:\DVR42\ISP\batch\ DVR42_8Bit.txt” then click

The content of DVR42_8Bit.txt file is described as follows:

```
debugon
SetBuffer 0x3000 4096
Reset 0
delay 500
setDelay 5000
RAMWrite C:\DVR42\ISP\batch\Isp.hex
run 0x500
delay 500
```

Before running the batch file, please make sure that *.hex file exists and being placed under proper directory. Also other driver files exist in the directory described above.

B. IC504 X226

Setting up ISP Connection for ATSC (IC504)

1. Power off mode plug in USB Hard driver on CN3001
2. Turn on DC power then select source to DVT you can see the message

Note:

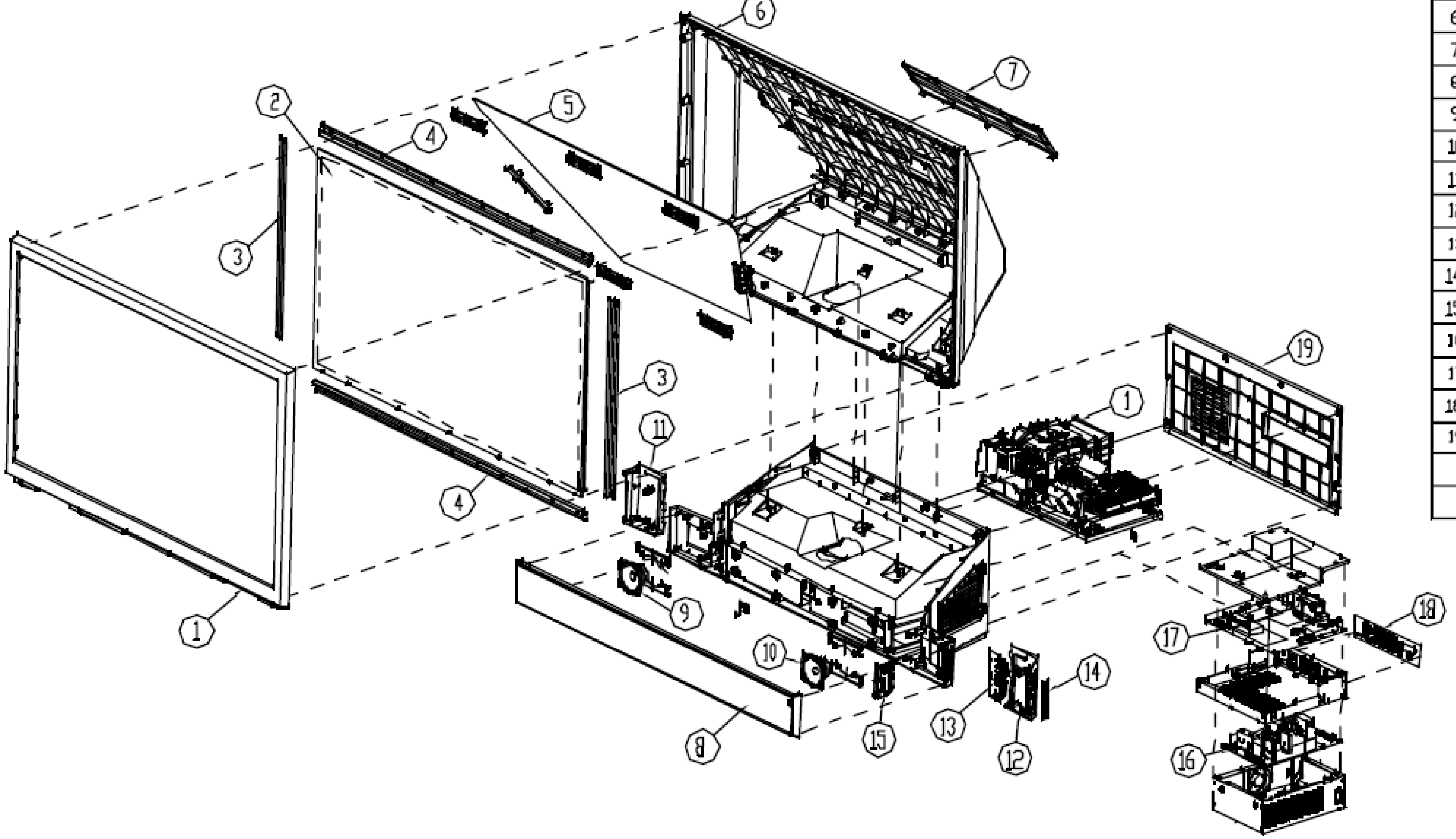
a. When IC504 is empty need copy xxx.pol file to USB Hard driver
b. When update firmware need copy xxx.udi file to USB Hard driver
c. USB Hard driver specification

S No.	Make and Model	MPN	Buy.com Item#
D2	Lexar Jump Drive 128MB	PD1280132	CD6PKX
D3	Lexar Jump Drive 2GB	JD2GB-231	CPU56W
D4	Memorex TravelDrive Flash Drive	USB 2.0 32507751	C7RV5J
D5	Iomega Mini USB 2.0 Drive	512MB 33005	C6K6SW
D9	US Modular 1.1 Portable flash	USBF-64	C3NVDK
D10	Sony 128MB Micro Vault	USM128DS	CFU3NN

Appendix B: Full Set Explode Drawing

ITEM	P/N	NAME
1	33901417XX	FRONT BEZEL
2	37975537XX	SCREEN ASSY
3	34602349XX	BKT SCREEN R/L
4	34602348XX	BKT SCREEN TOP/BOT
5	32502134XX	MIRROR
6	33903117XX	BACK CABINET
7	33901445XX	COVER NAMEPLATE
8	33901418XX	COVER BASE FRONT
9	37902005XX	SPEAKER LEFT
10	37902011XX	SPEAKER RIGHT
11	33901420XX	COVER LEFT
12	33980150XX	COVER RIGHT
13	5600110477	FRONT BD
14	32028076XX	LABEL I/O
15	5600110476	KEY BD
16	5600110479	POWER BD
17	5600110475	MAIN BD
18	32028075XX	LABEL CONNECTOR
19	33903118XX	COVER REAR

FULLSET EXPLODE



Appendix C: Disassembly

-- CAUTION--
ENSURE THE
A/C Power Cord IS
DISCONNECTED

Replace module

MB 01	Replace Control Module
MB 02	Replace Optical Engine

MB 01 : Replace the control module

Step 1	Removing the Base Cover
Step 2	Disconnect the Wire from Main BD
Step 3	Disconnect the wire from Power BD
Step 4	Pull out the Power cord
Step 5	Disconnect the Micro switch Wire
Step 6	Disconnect the Optical Fan and Ballast Fan Wires
Step 7	Disconnect the Ballast Power Wire
Step 8	Disconnect the Speaker Left Wire
Step 9	Disconnect the Speaker Right Wire
Step 10	Disconnect the Function Key Wire
Step 11	Disconnect the Front BD Wire
Step 12	Take out the Control Module

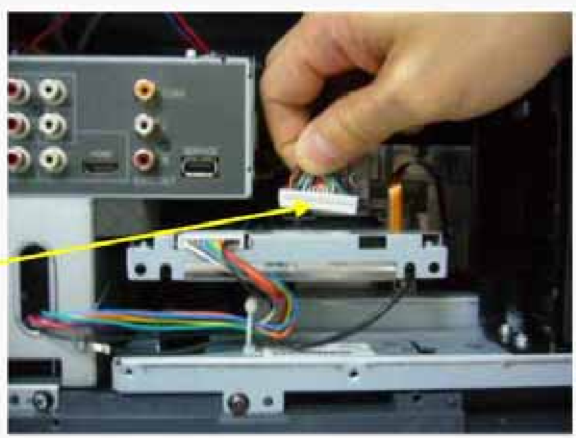
Step 1 --Remove the Base Cover



1. Remove the screws of the Base Cover. (Total 10 screws)

Step 2 -- Disconnect the Wire from Main BD





1. Disconnect the Wire from Main BD

Step 3 – Disconnect the wire from Power BD





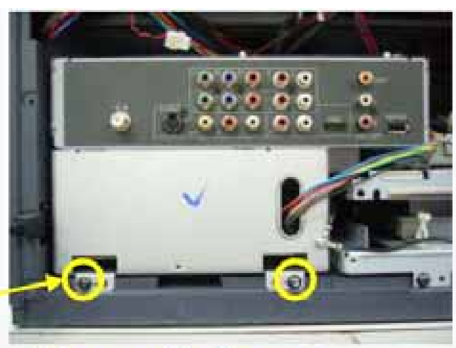
1. Open the Wire clip



2. Disconnect the Wire from Power BD

Step 4 – Pull out the Power cord





1. Remove the 2 screws



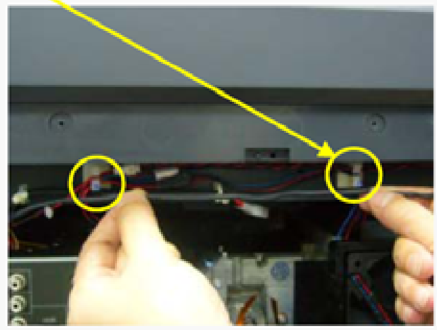
2. Pull out the Power cord

Step 5—Disconnect the Micro switch Wire





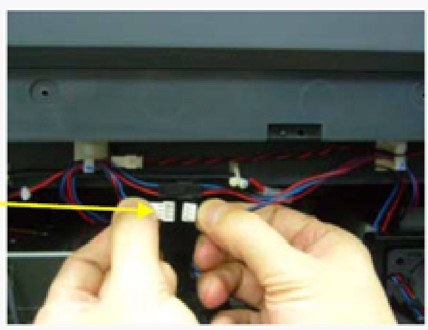
1. Disconnect the Micro switch Wire.



2. Take out the Micro switch Wire from Wire Clip.

Step 6 - Disconnect the Optical Fan and Ballast Fan Wires

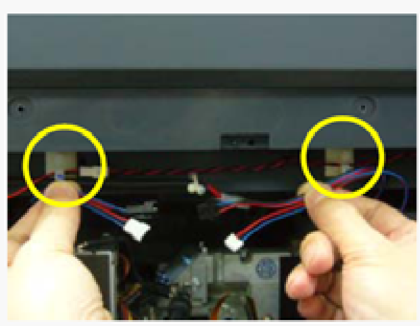




1. Disconnect the Ballast Fan wire



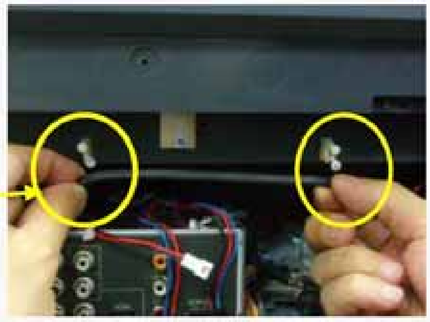
2. Disconnect the Optical Fan Wire



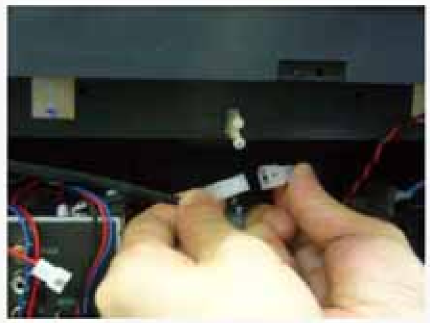
3. Take out these two wires from Wire Clip

Step 7 – Disconnect the Ballast Power Wire





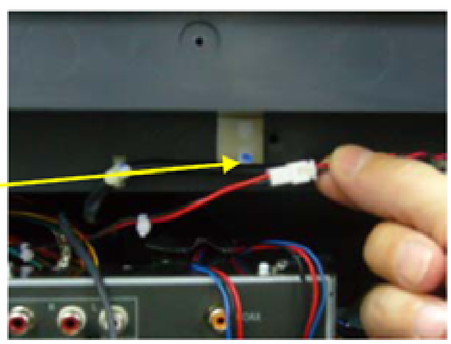
1. Take out the Ballast Power Wire from Wire Clip



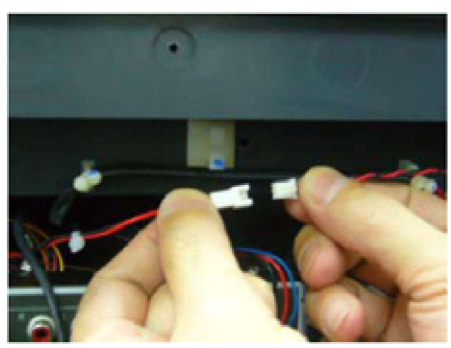
2. Disconnect the Ballast Power wire

Step 8 – Disconnect the Speaker Left Wire





1. Take out the Speaker Left Wire from Wire Clip



2. Disconnect the Speaker Left Wire

Step 9 – Disconnect the Speaker Right Wire



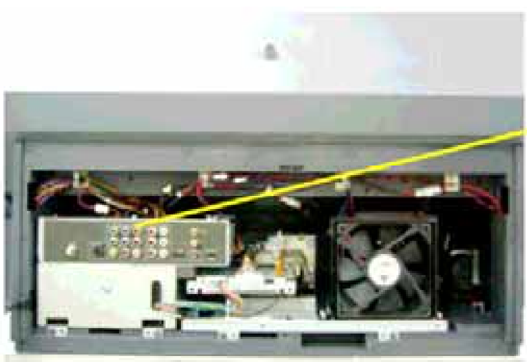


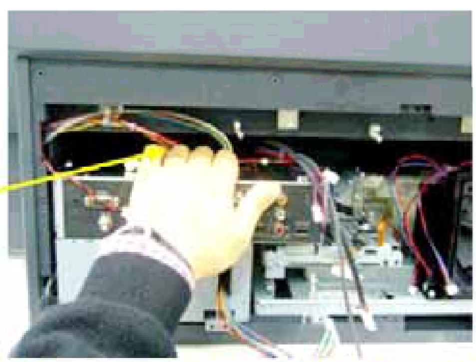
1. Take out the Speaker Right Wire from Wire Clip



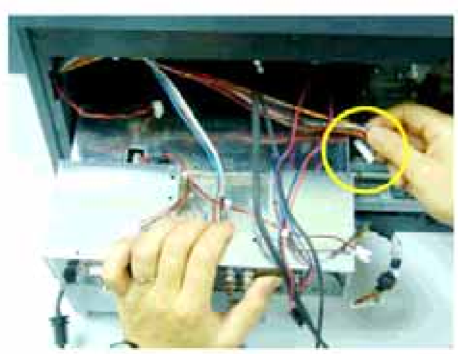
2. Disconnect the Speaker Right Wire

Step 10 – Disconnect the Function Key Wire





1. Take out the Control Module a little



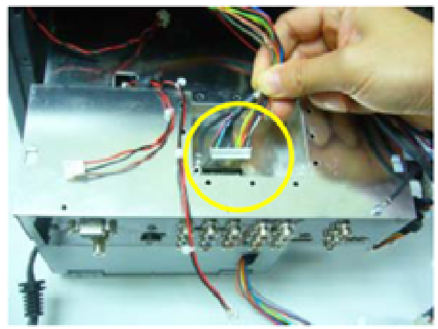
2. Disconnect the Function Key Wire

Step 11 – Disconnect the Front BD Wire



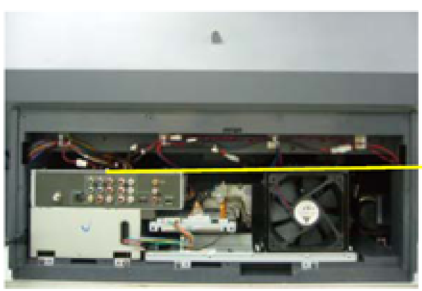


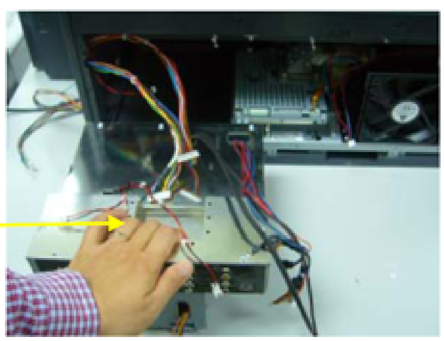
1. Remove the screw from Ground Wire



2. Disconnect the Front BD Wire

Step 12 – Take out the Control Module





1. Take out ALL the Control Module



OK

MB 05 : Replace the Optical Engine

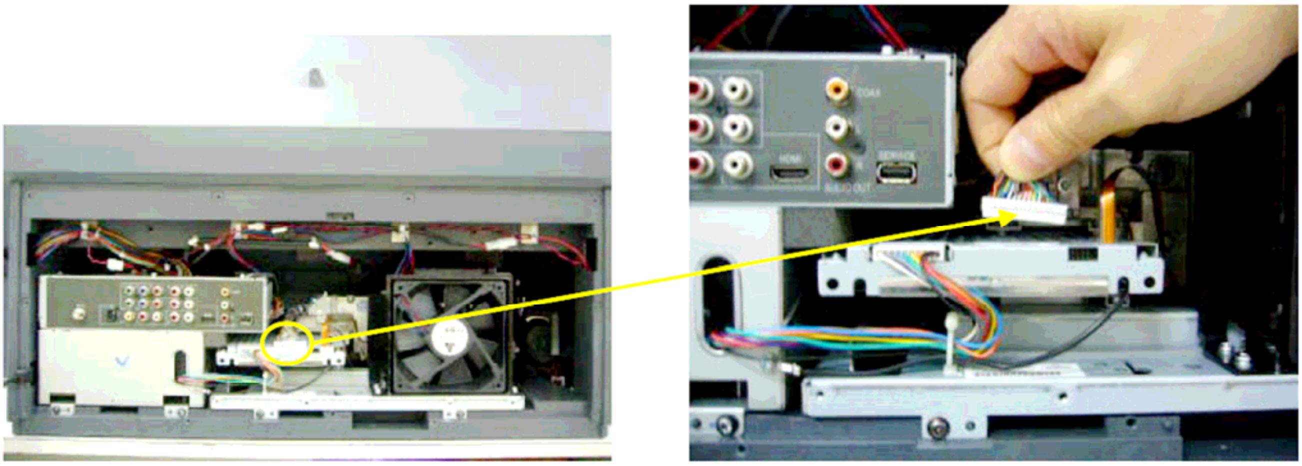
Step 1	Removing the Base Cover
Step 2	Disconnect the Wire from Main BD
Step 3	Disconnect the wire from Power BD
Step 4	Disconnect the Optical Fan and Ballast Fan Wires
Step 5	Disconnect the Ballast Power Wire
Step 6	Open the Lamp cover and take out the AL Tape
Step 7	Remove the 2 screws
Step 8	Pull out the Optical Engine

Step 1 --Remove the Base Cover



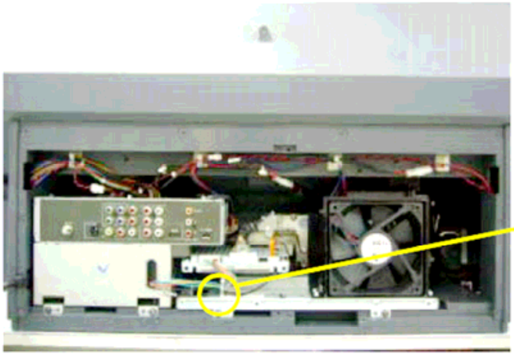
1. Remove the screws of the Base Cover. (Total 10 screws)

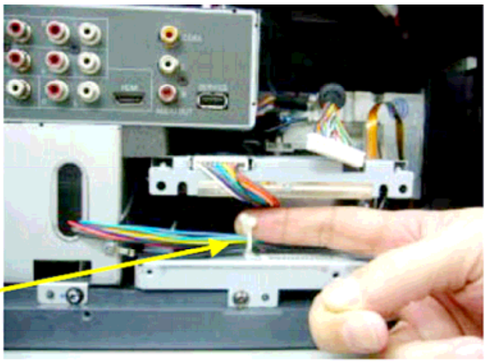
Step 2 -- Disconnect the Wire from Main BD



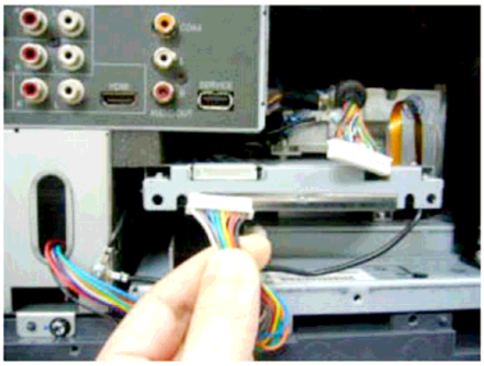
1. Disconnect the Wire from Main BD

Step 3 – Disconnect the wire from Power BD





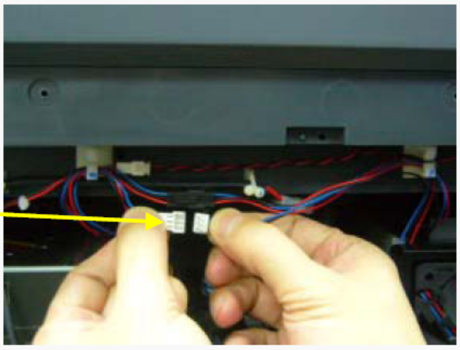
1. Open the Wire clip



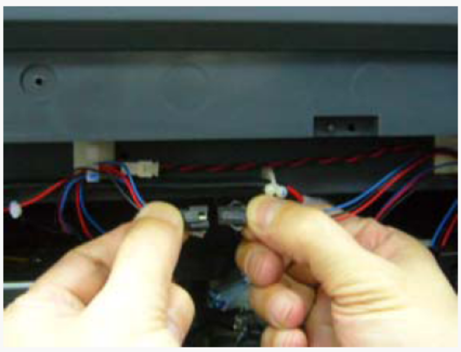
2. Disconnect the Wire from Power BD

Step 4 - Disconnect the Optical Fan and Ballast Fan Wires

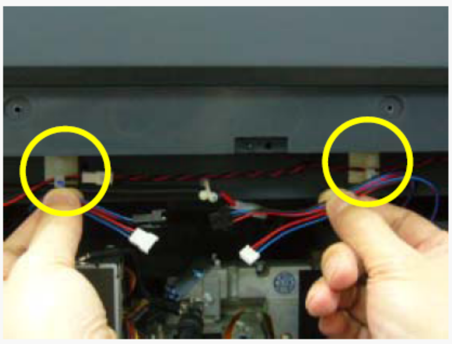




1. Disconnect the Ballast Fan wire

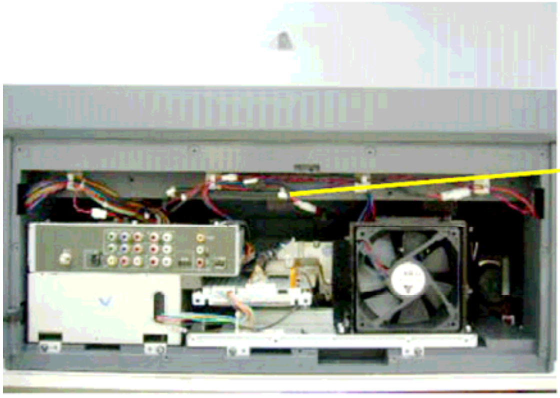


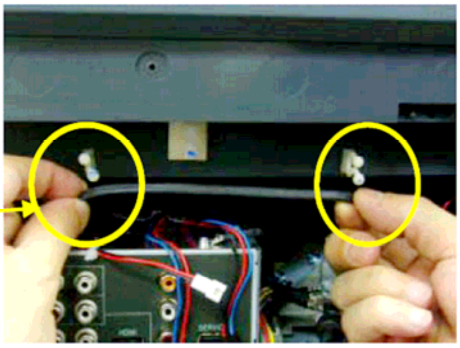
2. Disconnect the Optical Fan Wire



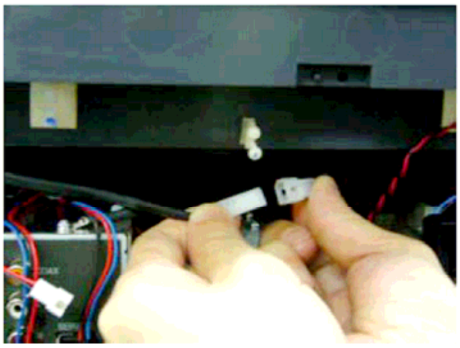
3. Take out these two wires from Wire Clip

Step 5 – Disconnect the Ballast Power Wire



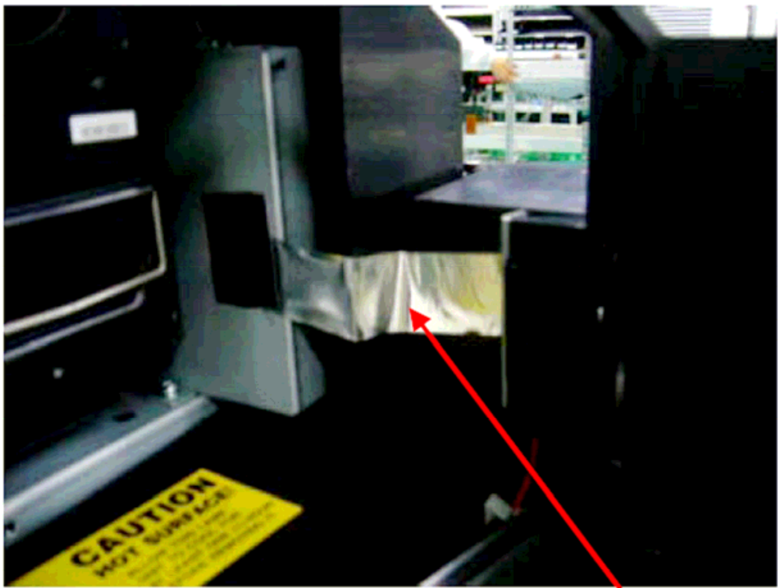


1. Take out the Ballast Power Wire from Wire Clip



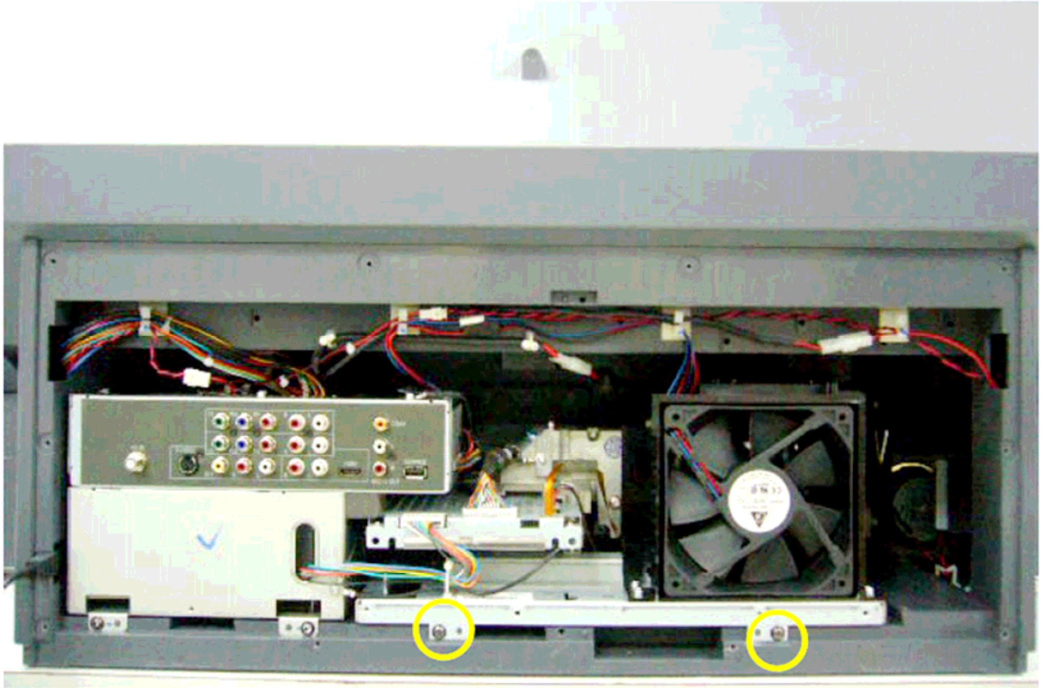
2. Disconnect the Ballast Power wire

Step 6 – Open the Lamp cover and take out the AL Tape



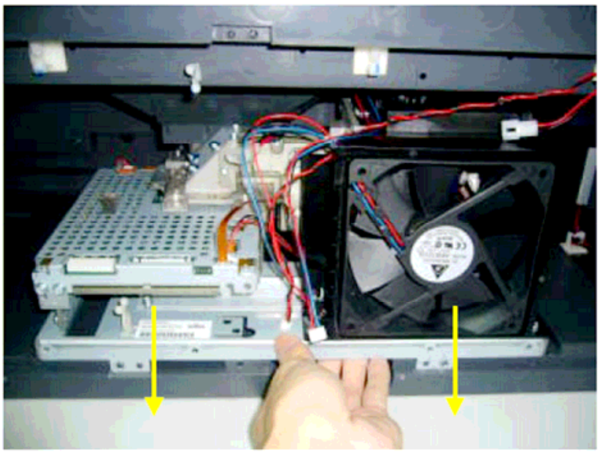
1. Open the Lamp cover and Take out the AL TAPE

Step 7 --Remove the 2 screws

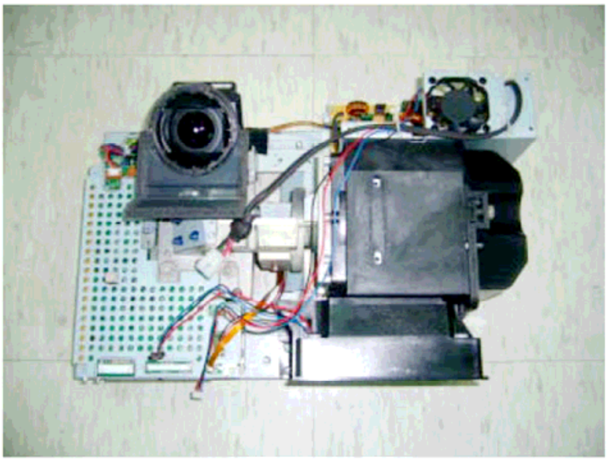


1. Remove these 2 screws

Step 8 -- Pull out the Optical Engine



1. Pull out the Optical Engine



OK

REPLACEMENT PARTS LIST

Location		TSB PN	REF#	Description
R1		75003323	5600600092-S	Mainboard assy
R2		75003324	5600600096-S	Power board assy
R3		75003325	5600600093	FRONT BD ASS'Y
R4		75003326	5600600091	FUNCTION KEY BD ASS'Y
R5		75003327	5600600095	IR BD ASS'Y
R6		75003328	5600600094	LED BD ASSY
R7	*	75003329	0990075000	Ballast
R8		75003333	3797619800-S1	Engine assy (note: without lamp)
R9	*	75003330	3620708911	Control FAN
R10	*	75003331	3620011111	Lamp Fan
R11	*	75003332	3620506111	Ballast Fan
R12		75003334	3670262601	WIRE WITH HOUSING 1007 #24 2P (P/B CN2003 TO AIR MICRO SW)
R13		75003337	3670262800	WIRE WITH HOUSING 1007 #24 2P (M/B CN802 TO SPEAKER L)
R14		75003342	3670342403	WIRE WITH HOUSING 1015 #18 3P (P/B CN1002 TO AIR BALLAST PHOENIX)
R15		75003358	3670342800	WIRE WITH HOUSING 1007 #24 3P (M/B CN801 TO SPEAKER R)
R16		75003360	3674037900	WIRE WITH HOUSING 1007 #26 4P (M/B CN5002 TO AIR FAN2)
R17		75003361	3674038000	WIRE WITH HOUSING 1007 #26 4P (M/B CN5003 TO AIR FAN3)
R18		75003362	3679060900	WIRE WITH HOUSING 1007 #24 13P (M/B CN201 TO P/B CN2002)
R19		75003363	3671033801	WIRE WITH HOUSING 1007 #28 14P (M/B CN403 TO KEY/B +IR/B +LED/B)
R20		75003364	3679061103	WIRE WITH HOUSING 1571 #28 32P (M/B CN404 TO DMD/B CN9002)
R21		75003365	3679061503	WIRE WITH HOUSING 1007 #24 10P (P/B CN2001 TO DMD/B CN9001)
R22	*	75003366	3090159403	AC POWER CORD 2P #18 *2C L1500 BLK
R23		75003367	3081400600	CABLE SIGNAL 9 PIN D-SUB
R24		75003368	3080338302	CABLE SIGNAL RCA RCA BLK
R25		75003369	3671034000	WIRE WITJ HOUSING 1007 1185 #28 L680 10P(MAIN BD TO D-SUB)
A1	*	75004308	3797317100-ST	Service lamp module
A2		75004304	3534011801	MANUAL PACKING ASSY DVR-4240 TA CA
A3	*	75003773	5041812700	REMOTE CONTROLLER 53KEYS DVR-4240 TA CA
L1		75004287	3200294600	LABEL Carton (Toshiba UPC label)
L2		75004288	3200710500	LABEL BARCODE -商檢號碼
L3		75004291	3262004101	LABEL WARNING of lamp door
L4		75004292	3264507501	LABEL for rear I/O
L5		75004290	3262003600	LABEL WARNING inside base
P1		75004293	3422104400	HANDLE PP 116*90.3*18*1.5 NAT
P2		75004294	3500323500	END BLOCK EPS 294.5*408.5*140
P3		75004295	3500323600	END BLOCK EPS 294.5*408.5*140
P4		75004296	3500323700	END BLOCK EPS 294.5*424.5*196
P5		75004297	3500323800	END BLOCK EPS 294.5*424.5*196
P6		75004298	3500323900	END BLOCK EPS 240*570*212.9
P7		75004299	3500324000	END BLOCK EPS 240*570*212.9
P8		75004300	3501342100	BAG EPE 1465*1280 (for TV unit)
P9		75004301	3512292201	TRAY PAPER 1113*416*204
P10		75004302	3517052201	TD CARTON PAPER 1132*436*869
O1		75004310	5059708181	PANEL DMD 0.45" 1280*720 HD5
O2	*	75004307	3797316300	COLOR WHEEL ASSY HD5
O3		75004289	3250217125	MIRROR GLASS 939.3*486.3
O4		75004309	3797619600-S	SCREEN ASSY DVR-4240 TA CA
IC201		75004272	2510411765	IC PWM DC TO DC SOP-8P SMD
IC504		75004277	2610670117	IC FLASH 16M*8 50nS TSOP-48P SMD
IC502		75004278	2610680060	IC FLASH 8M 90nS TSOP-48P SMD
IC207		75004268	2500161853	IC REGU 5V 5A 2% TO-252-3P SMD
IC405		75004275	2610487342	IC EEPROM 32K 10mS SOIC-8P SMD
IC213		75004264	2500058810	IC REGU 2.5V 1.2A 2% SOT-223-3P SMD
IC212		75004263	2500058010	IC REGU 3.3V 1.3A 2% SOT-223-3P SMD
IC5001		75004262	2500047320	IC REGU 2.64V 1A 2.5% SC-63-5P SMD
IC209		75004266	2500161337	IC REGU 2.5V 5A 1.2% TO-263-3P SMD
IC215		75004269	2500182010	IC REGU ADJ 1.25V 1.5A 4% D2PAK-3P SMD
IC214		75004265	2500058937	IC REGU 1.8V 800mA 1.11% SOT-223-3P SMD
IC205		75004267	2500161537	IC REGU 1.8V 5A 1.11% TO-263-3P SMD

REPLACEMENT PARTS LIST

Locatio n		TSB PN	REF#	Description
Locatio n		**TSB PN**	**REF#**	**Description**
IC503		75004276	2610625042	IC FLASH 1M*8 SOIC-8P SMD
IC705		75004274	2530246288	IC VIDEO AMP VSOP-8P SMD
X701		75004318	0730810112	CRYSTAL 28.322MHz 30PPM 20pF SMD-49 SMD
X3001		75004319	0730770112	CRYSTAL 26.1621MHz 30PPM 18pF SMD-49 SMD
X402		75004320	0730760112	CRYSTAL 19.6608MHz 30PPM 18pF SMD-49 SMD
X801		75004321	0730520612	CRYSTAL 18.432MHz 50PPM 16pF SMD-49 SMD
TM701		75004261	2320504006	TUNER NTSC/JPN PHONO HORI
TM704		75004260	2320503617	TUNER ATSC PHONO HORI
F1001	*	75004323	0805240801	FUSE T C 5A 250V CLIP
CR1001		75004324	200124110020	DIO BRD 25A 600V 5S-4P
IC1001		75004273	2510438014	IC PFC SOIC-8PIN
IC1002		75004279	2633000842	IC ASIC DUAL OP+VOL REF SOIC-8P SMD
IC1003		75004270	2510176709	IC PWM PWM+MOS P-TO220-6-47-6P
IC1004		75004258	2310040709	PHOTO TR 60mA 70V DIP-4P 100-200% 10.16m
IC1005		75004271	251039702B	IC PWM DC TO DC SO-8P SMD
IC2004		75004259	2310104312	PHOTO TR 50mA 70V DIP-4P 100-200% 10.16m
Q2006		75004325	242601105831	FET 30V 10A 13.5mohm LL SOIC-8P SMD AD
EE30	*	75004305	3791013700	SPEAKER-L DVR-4240 TA CA
EE31	*	75004306	3791013800	SPEAKER-R DVR-4240 TA CA
EE32	*	75004327	0910500011	TH1001
EE33	*	75004282	2805520601	FL1001
EE34	*	75004283	2805786801	FL1002
EE35	*	75004285	2809550500	FL1003
EE36	*	75004286	2875005200	FL1004
EE37	*	75004284	2806601300	L1001
EE38	*	75004303	3521012300	L1002
EE39	*	75004253	1604315524	CX1001
EE40	*	75004251	1101330027	CY1001
EE41	*	75004251	1101330027	CY1002
EE42	*	75004252	1101342027	CY1003
EE43	*	75004252	1101342027	CY1004
EE44	*	75004252	1101342027	CY1005
EE45	*	75004329	0923010145	VA1001
EE46	*	75004324	200124110020	CR1001
EE47	*	75004336	147421510248	C1004
EE48	*	75004270	2510176709	IC1003
EE49	*	75004338	242018040508	Q1009
EE50	*	75004339	242077261035	Q1003
EE51	*	75004258	2310040709	IC1004
EE52	*	75004258	2310040709	IC1006
EE53	*	75004259	2310104312	IC2004
EE54	*	75004281	2801254800	T1001
EE55	*	75004280	2800301600	T1002

* SAFETY CRITICAL PART
Replace only with identical part

TOSHIBA CORPORATION
1-1, SHIBAURA 1-CHOME, MINATO-KU, TOKYO 105-8001, JAPAN